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Recent Literature on Meteors and Zodiacal Light, p. 1109

8 August 1957 No. 8

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***EDITORIAL OFFICE:** Washington, D. C. **P.O. ADDRESS:** Box 1736, Washington 13, D. C. Telephone: REpublic 7-6278.

ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 3 Joy Street, Boston 8, Mass.

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METEOROLOGICAL ABSTRACTS AND BIBLIOGRAPHY

MALCOLM RIGBY, Editor

Vol. 8 AUGUST, 1957 No. 8

SPECIAL FEATURE IN THIS ISSUE

Recent Literature on Meteors and Zodiacal Light

By

Mary L. Rice

(*For complete table of contents see back cover*)

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FOREWORD

Meteorological Abstracts and Bibliography is a monthly publication whose purpose is to bring to the attention of meteorologists current literature in their field and in related fields and to provide bibliographic information on various subjects, as interest demands.

Part I contains abstracts of current literature in the fields of meteorology, oceanography, etc., arranged according to the Universal Decimal Classification.

Part II of each issue comprises an annotated bibliography of important references on a special subject (usually arranged chronologically). No attempt is made to prepare exhaustive bibliographies; instead, the aim is to include a representative cross section of the various aspects of a subject.

Bibliographies published in the successive issues were:

Vol. I, 1950

1. Atmos. Pollution	2. Aerobiology	3. Cloud Physics	4. Hail
5. Tornadoes	6. Volcanic Dust	7. Climat. Changes	8. Thunderstorms
9. Icing	10. Acoust. Propagation	11. Evaporation	

Vol. II, 1951

1. Extended Forecast.	2. Long Range Forecast.	3. Soil Temp.	4. Constants, etc.
5. Clim. of Near East	6. Clim. of Middle East	7. Special Winds	8. Radar Storm Detect.
9. Condensation Trails	10. Clim. of N.E. Africa	11. Mountain Met.	

Vol. III, 1952

1. Clim. of N.W. Africa	2. Carbon Dioxide	3. Clim. of Argentina, etc.	4. Dew
5. Objective Forecast.	6. Stratus Forecast.	7. Urban Climatology	8. Clim. of C. Africa
9. Visibility	10. Glaze and Rime	11. Free Air Turbulence	

Vol. IV, 1953

1. Turbulence Theory	2. Turbulent Diffusion	3. Frost	4. Clim. of Australia, etc
5. High Level Winds	6. Winds in Stratosphere	7. Jet Stream	8. Radiation Bioclim.
9. Clim. of Pacific	10. Auroras	11. Sferics	

Vol. V, 1954

1. Oceanog. Met.	2. Clim. of S.E. Asia	3. Auroral Physics	4. Tropopause
5. Balloons	6. Numerical Forecast.	7. Radiation Data	8. Vertical Motion
9. Clim. of Arctic	10. Industrial Met.	11. Wind Waves and Swell	

Vol. VI, 1955

1. Bibliog. of Bibliog.	2. Texts & Monogr. Bibliogs.	3. Storm Surges
4. Ionospheric Prop.	5. Photochem.—Upper Atmos.	6. Cloud Physics
7. Radar Cloud Physics	8. Atmos. Nuclei (1841–1950)	9. Atmos. Nuclei (1951–1955)
10. Weather Modification	11. Cooling Power	

Vol. VII, 1956

1. Synoptic Met.-Arctic	2. Clim. of Enclosed Spaces	3. Cosmic Rays (–1952)
4. Cosmic Rays (1953–56)	5. Atmos. Radioactivity	6. Inversions
7. Snow Micromet.	8. Snow Micromet. (Suppl.)	9. Tropical Cyclones
10. Hurricane Damage	11. Tropical Cyclone Theory	

Vol. VIII, 1957

1. Solar Relations with Weather	4. Forest Micrometeorology	7. Albedo
2. Night Airglow	5. Hydrometeorological Forecasting	8. Meteors
3. Forecasting of Special Elements	6. Numerical Forecasting (Suppl.)	

Other bibliographies in preparation are:

Actinometers	*Ozone*
Human Bioclimatology	*Radio Astronomy*
High Atmosphere Temperatures	*Singularities*
Microwave Propagation	*Synoptic Aerology*

Part III contains a listing of reviews, translations, reprints, and the contents of important publications. These are published in the earliest issue where space permits.

Part IV is made up of author, subject and geographical indexes. The December issue comprises cumulative author, subject, geographical and journal indexes.

EXPLANATIONS

Location of material: For each entry, a symbol is given for at least one library where the material may be found. The Union List of Serials (Gregory) is the source of most of the symbols used. In some cases, where no symbol has been assigned to a library, one will be devised according to the principles of the Union List.

Library symbols used frequently may be found in the following list:

DA:	U. S. Dept. of Agriculture Library, Washington, D. C.
DBS:	U. S. Bureau of Standards Library, Washington, D. C.
DGS:	U. S. Geological Survey Library, Washington, D. C.
DLC:	Library of Congress, Washington, D. C.
DN-HO:	U. S. Navy Hydrographic Office Library, Suitland, Md.
DSG:	U. S. Army Medical Library, Washington, D. C.
DSI:	Smithsonian Institution Library, Washington, D. C.
DWB:	U. S. Weather Bureau Library, Washington, D. C.
GB-MO:	Great Britain, Meteorological Office Library, Harrow, England.
MH-BH:	Harvard University, Blue Hill Observatory Library, Milton, Mass.

Other symbols:

*	before an entry indicates a good data source.
†	before an entry indicates a good bibliography.
§	before an entry indicates a synoptic case history study accompanied by charts

Geographic locations are in the English form rather than the form used locally, for example Moscow for Moskva.

Titles of articles or monographs are in the language of the original article unless otherwise stated. Slavic (Cyrillic) titles are transliterated into the Roman alphabet according to the Library of Congress transliteration scheme.

Abbreviations:

Titles of periodicals are not abbreviated, as a rule.

The months of the year from March to July are not abbreviated. Other months are abbreviated as Jan., Feb., Aug., Sept., Oct., Nov., and Dec.

The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

PART I. ABSTRACTS OF CURRENT METEOROLOGICAL MATERIAL

MAJOR GENERAL WORKS

COLLECTED WORKS

See also: **Statistical analysis of chronological series** (Kivéliovitch), 8.8–117.

8.8–1 550.3(08)

†**Advances in Geophysics,** ed. by H. E. Landsberg, Vol. 3. New York, Academic Press, **1956.** 378 p. figs., tables, refs at end of each ch., eqs. Articles abstracted separately. (For listing of contents, *see* Pt. III, p. 404, March 1957, *MAB.*) **DWB, DLC.** Review by K. R. Ramanathan in *Current Science,* Bangalore, 26(7):205–206, July **1957. DLC.** Review by R. M. Goody in *Royal Meteorological Society, Quarterly Journal,* 83(357):412–413, July **1957. DWB—Advances in Geophysics** continues to maintain its high editorial and publishing standard and its wide range of subject interest. Vol. 3 contains articles on Arctic ice island research (CRARY), Sky light polarization (SEKERA), Subcontinental structure (BYERLY), Geothermy at the ocean bottom (MAXWELL and REVELLE), interior of earth (J. A. JACOBS), Ground water hydrology prospecting (JONES and SKIBITZKA) and Earth satellites (SINGER). Vol. 4 is in press. (For abstracts on V. 1 and 2, *see* 4.4–10, April 1953 and 6.7–1, July 1955, *MAB.*) *Subject Headings:* **1. Advances in geophysics 2. Geology 3. Satellite observatories 4. Sky light polarization. I. Landsberg, H. E.** (*ed.*).—*M.R.*

8.8–2 551.578.4(08)

*†Akademiia Nauk SSSR. Institut Geografii, **Sneg i talye vody ikh izuchenie i ispol'zovanie.** [Snow and snow melt, their study and use.] Moscow, Akademiia Nauk SSSR, **1956.** 271 p. figs., tables, refs., eqs. p. 251–271, Literature on snow and snow cover, 1950–1954. Individual articles abstracted separately. (For listing of contents, *see* Pt. III, p. 1003, July 1957, *MAB.*) **DWB**—A collection of a score of papers on various aspects of snow cover and its utilization with a wealth of tabular and graphic data and references. The first article (by G. D. RIKHTER) discusses the general problem of snow cover research. There follow 5 papers on physical-mechanical characteristics of snow cover, 8 papers on snow melt and runoff (in plains, mountains, forests, frozen ground, etc.), and 4 papers on the geography of snow cover and its role in local weather in forest, tundra and mountain slopes. Finally, there is a 21 page annotated bibliography on the above aspects of snow research, including agricultural uses, and avalanche protection. Individual papers are abstracted separately. *Subject Headings:* **1. Snow research symposia 2. Snow melt research 3. Snow cover research 4. Snow bibliographies. I. Rikhter, G. D.**—*M.R.*

8.8–3 551.509.33(08) 551.5:622.323

American Petroleum Institute, 36th Annual Meeting, Chic., Nov. 1956, **Proceedings of the Session on Weather Forecasting (Preprints).** 30 p. figs., refs. (For listing of contents, *see* Pt. III, p. 1005, July 1957, *MAB.*) **DWB** (MO9.A5125)—These proceedings include 6 papers presented at the Institute's session on weather forecasting, sponsored by the Advisory Committee on Fundamental Research on Weather Forecasting and held at the Conrad Hilton Hotel, Chicago, on Nov. 12, 1956. Papers (which will be abstracted separately) were by H. C. WILLETT of MIT, WALTER ORR ROBERTS, Director of the High Altitude Observatory at Boulder, Colo., CHARLES PENNYPACKER SMITH, W. H. KLEIN and W. J. SWEENEY, and covered 30 day forecasts, long range forecasts, solar weather relations, degree-day forecasting for petroleum industry and persistence in weather patterns. *Subject Headings:* **1. Long range forecasting seminars 2. Weather and petroleum industry.**—*M.R.*

8.8–4 551.586:628.8(08)

American Society of Heating and Air-Conditioning Engineers, **Transactions, Vol. 61 and 62 (of the 61st and 62nd annual meetings, etc.).** Issued **1956.** about 575 p. each. figs., tables, refs., eqs. (For listing of Contents of Vol. 61, *see* Pt. III, p. 543, April 1957, *MAB.*) **DWB** (P A5125W)—These two volumes contain nearly 70 articles on various aspects of air conditioning engineering as presented at annual and semi-annual meetings in Philadelphia (1955), Oklahoma City (1955), San Francisco (1955), Cincinnati (1956) and Washington, D. C. (1956). The complete papers, plus discussions and transactions of each meeting, are included. Solar energy utilization, snow melting, heating and cooling degree day studies, weather data analysis, air cleaning, insulation, panel heating, comfort and physiological research are among the subjects covered. *Subject Heading:* **1. Air conditioning and heating symposia.**—*M.R.*

8.8–5 523.78(08) 551.510.535:523.78

†**Solar eclipses and the ionosphere: a symposium held under the auspices of the International Council of Scientific Unions Mixed Commission on the Ionosphere, in London, Aug. 1955.** Editors, W. J. G. Beynon and G. M. Brown. London, Pergamon, **1956.** 330 p. figs., tables, eqs., refs. at end of each ch. Literature on solar eclipses and the ionosphere (including) chronological catalogue of eclipses, p. 308–320 (225 refs.). Issued as Vol. 6 of the **Special Supplements to the Journal of Atmospheric** and **Terrestrial Physics.** Articles abstracted separately. (For listing of contents, *see* Pt. III, p. 1014, July 1957, *MAB.*) **DWB.** Review by R. M. Goody in *Weather*, 12(6):198, June **1957.** Review by R. L. Smith-Rose in *Nature*, London, 179(4562):711, April 6, **1957.** Also: Beynon, W. J. G., **Solar eclipses and the ionosphere.** *Nature*, London, 176(4490):947–948, Nov. 19, **1955. DLC**—A collection of over 50 papers and discussions presented at the symposium held Aug. 22–24, 1955 in the rooms of the Royal Society, London, attended by 80 delegates from 18 countries. The papers are grouped under: general theory, ionospheric eclipse results, solar radiation and layer theory, recombination, geomagnetic eclipse phenomena, solar radio noise and miscellaneous. Conclusions regarding the eclipse effects on the various layers are summarized on p. 306–72 The vast literature on the 28 eclipses of the sun and ionospheric effects thereof from 191 –1954 (especially important are the 1932, 36, 40, 45 and 1952 eclipses) is listed chronologically along with a detailed author index to the bibliography, a list of delegates and their affiliations and a name index. *Subject Headings:* **1. Solar eclipse effects 2. Eclipse effects on ionosphere 3. Ionosphere symposia 4. Ionosphere bibliographies 5. Eclipse bibliographies 6. Solar influences 7. Radio sounding of ionosphere 8. Geomagnetism.**—*M.R.*

8.8–6 551.513:532.5(08)

U. S. Office of Naval Research, **Fluid models in geophysics. Proceedings of the First Symposium on the Use of Models in Geophysical Fluid Dynamics held at Johns Hopkins Univ., Sept. 1–4, 1953.** Ed. by Robert R. Long. Sponsored by the Office of Naval Research, Geophysics Research Directorate and the U. S. Weather Bureau. Wash., D. C., U. S. Govt. Print. Off., **1956.** 162 p. figs., tables, refs., eqs. **DWB, DLC** (QC809.F5U5)—The conference was held in order to discuss the serious problems which arise when laboratory models are used to simulate atmospheric or oceanographic-hydrologic phenomena from 10 to 1000 or more mi in extent. No theory exists for dealing with rotating fluids or fluids with stratification in connection with solid bodies or obstacles. Ten papers, dealing with dimensional analysis, meteorologically analogous fluid experiments, Southern Hemisphere circulation, oceanic circulation, thermal convection, free convection due to boundary sources, long waves, etc. are presented (and are analyzed separately). (For listing of contents, *see* Pt. 3, p. 1146, Aug. 1957, *MAB.*) *Subject Headings:* **1. Fluid models in geophysics 2. Rotating dishpan experiments. I. U. S. Air Force. Geophysics Research Directorate II. U. S. Weather Bureau III. Long, Robert R.** (*ed.*).—*M.R.*

NEW SERIALS

8.8–7 551.594.14(05)

***Bulletin of the Atmospheric Radioactivity,** Tokyo, No. 1, April/June 1955–. Latest issue seen, No. 4, Jan./March **1956.** Quarterly (irregular) about 80 p. each. mostly tables. Pub. by the Japan Meteorological Agency, Tokyo (earlier numbers by Central Meteorological

Observatory, Tokyo). In Japanese and English. **DWB**—Work of the fallout radioactivity observation service of the Japanese Meteorological Service is outlined and its data (15 stations and 2 ships from April 1, 1955), methods of collecting rainwater and of measuring radioactivity of rainwater and falling dust, and of analyzing data, eliminating background radiation, station location chart, and standards used are described and presented. Tables include: 1) summary of mean radioactivity in rain collected at a fixed time daily and amount of rain collected; 2) radioactivity in first 1 mm of rain once or twice a day; 3) radioactivity in dust collected in a basin; 4) observed radioactivity in large amount of rain collected at a fixed time daily; 5) atmospheric radioactivity in first 1 mm of rain in storm; 6) radioactivity in air-borne dust collected in a dust collector. *Subject Headings:* **1. Radioactive fallout data 2. Serial publications 3. Japan. I. Japan. Central Meteorological Observatory, Tokyo II. Japan Meteorological Agency, Tokyo.**—*M.R.*

8.8–8 551.5(05,26)

The Mariner's Weather Log, Wash., D. C., Vol. 1, No. 1, Jan. 1957. Latest issue seen, 1(4), July **1957.** G. C. Bristow, ed. Bi-monthly. Issued by U. S. Weather Bureau. Price: $1.00 annual, from Govt. Print. Office, Wash., D. C. figs., photos, charts. **DWB**—This new bimonthly review of weather over the oceans and Great Lakes contains at least two lead articles (in each issue) on subjects in marine meteorology of current interest or of historical interest, letters, notes, observations and the marine meteorological data published in **Weather of the oceans** section of the **Monthly Weather Review** (before World War II). The tabular data consists of selected ship reports giving wind, pressure, visibility, weather, air and sea temperature and wave direction, period and height, position of ship, time, date, nationality and name of vessel reporting a gale. A "Rough weather log" gives a description of weather during each of the past 3 months. A "Smooth Log" gives a summary, based on verified and completed data, of conditions in the oceans and lakes for the 2 months previous to those summarized in the "Rough log." Two full page charts show tracks of cyclones during the 2 months covered by the "Smooth Log" in North America, the East Pacific and West Atlantic. A "Marine Weather Diary" gives general summary of weather and notable weather events in history for the current month and the coming month. The new periodical is about half way between "Wetterlotse" and the "Marine Observer" in quality of publication. *Subject Headings:* **1. Mariner's Weather Log 2. Serial publications 3. Marine meteorological periodicals. I. Bristow, G. C.** (*ed.*).—*M.R.*

TEXTBOOKS AND POPULAR BOOKS

8.8–9 551.521:551.524.3(02)

†Berliand, Mark Evseevich, **Predskazanie i regulirovanie teplovogo rezhima prizemnogo sloia atmosfery.** [Forecasting and regulating the thermal regime of the surface layer of the atmosphere.] Leningrad, Gidrometizdat, **1956.** 434 p. 94 figs., 24 tables, 525 refs., eqs. **DLC** (QC 901.B4). Review by P. N. Tverskoĭ in *Meteorologiia i Gidrologiia,* No. 11:51–52, Nov. **1956. DLC**—A systematic, up-to-date treatment of the many processes affecting the heat regime of the soil, vegetation and earth, and of the use of theoretical and empirical data on thermal and radiative balance (clouds, fog, wind, humidity, sunshine, temperature, evaporation from soil, and outgoing radiation) in predicting frost, dew, fog and minimum temperature, and transformation of air masses in natural conditions. The final chapter discusses protection of orchards and gardens against frost by smoke and other artificial means. The work is intended as a textbook for specialists or students at advanced levels, presupposing a good understanding of calculus and physics, but it is so arranged that a student (say of agriculture) without advanced mathematical training could obtain the maximum benefit from the "practical" part of the work. *Subject Headings:* **1. Thermal balance of earth's surface 2. Frost forecasting 3. Frost protection 4. Textbooks on thermal balance.**—*M.R.*

8.8–10 551.5(02)

†Blair, Thomas Arthur and Fite, Robert C., **Weather elements: a text in elementary meteorology.** 4th ed. rev. by R. C. Fite. Englewood Cliffe, N. J., Prentice-Hall, **1957.** 414 p. 145 figs., 5 tables, numerous refs., bibliog. p. 379–384. **DLC** (QC 861.B58)—This

standard and popular textbook on elementary (college) meteorology has gone through 3 editions since 1937 when the first edition appeared. Because of the large number of innovations that have occurred since World War II, it was necessary to considerably revise the old work in order to incorporate these developments. Some of the new material involves discussion or elaboration on topics such as: the jet stream, cloud seeding, the tropopause, thunderstorm and tornado prediction, facsimile map transmission, numerical weather prediction, carburetor icing, lee waves, hail, private weather services, etc. There are chapters on aviation and weather, electrical and optical phenomena, climate, world weather and climatic influences, weather and health, culture, agriculture, solar and oceanic influences, and the weather services of the U. S. (including the Air Weather Service and Naval Aerology). *Subject Headings:* 1. **Meteorology textbooks 2. Elementary meteorology.**—*M.R.*

8.8–11 551.5(023)

Bolton, Joe, **The wind and the weather.** N. Y., Crowell, **1957.** 277 p. photo. **DLC** (QC981.B69)—An unusually interesting and generally accurate account of many of the aspects of weather which most affect the public. The difficulties of making forecasts, old fashioned (cold or snowy) winters, hurricanes, tornadoes and blizzards, their reconnaissance, forecasting and warnings for the public; cloud physics and seeding; radioactive clouds and detection of radioactivity; military and naval meteorology and climatology; sunspot cycles; smog; weather and man; Krick; the IGY satellite observatory; weather lore, how weather has changed history, etc. The book represents a lot of historical research as well as hitting the high spots on recent developments in meteorology since World War II. Review by Stephen S. Visher in *Scientific Monthly*, 84(6):324, June **1957.** *Subject Heading:* **1. Popular meteorology books.** —*M.R.*

8.8–12 551.5:629.13(02)

Dannevig, Petter, **Meteorologi for flygere.** [Meteorology for fliers.] Oslo, H. Aschehoug, **1954.** 224 p. 86 figs., 9 plates (fold.), 8 tables. **DLC**—This is a well arranged textbook of descriptive meteorology containing numerous diagrams, charts and photographs especially designed for fliers. The characteristics of the individual meteorological variables, the methods and apparatus used in studying them and their spatial and temporal variations, the general circulation, weather forecasting, etc., are discussed. Special aspects of meteorology of interest to aviation such as pressure flying, special winds, flying in warm and cold air, weather operations for fliers, etc., are taken up. *Subject Headings:* **1. Aviation meteorology 2. Meteorology textbooks.**—*I.L.D.*

8.8–13 551.593(02)

†Dietze, Gerhard (*Gotha*), **Einführung in die Optik der Atmosphäre.** [Introduction to atmospheric optics.] Leipzig, Geest & Portig, **1957.** 263 p. numerous figs., tables and eqs., bibliog. p. 253–255.—This is the most complete text on atmospheric optics since **Meteorologische Optik** by PERNTER-EXNER last appeared in 1930. Since then a large number of advances have made it necessary to compile a completely new text. The emphasis is mainly on the geometrical (illustrated by diagrams) rather than the pure mathematical (equations) presentation. The 12 chapters, each with many detailed sub-headings, cover: 1) general; 2) apparent shape of sky and attending phenomena; 3) refraction in a cloudless atmosphere (astronomic, terrestrial, abnormal, mirage, scintillation); 4) halos (reflection, refraction, multiple reflection or refraction, ice crystal phenomena); 5) rainbows (primary, secondary, colors); 6) glories, Bishop's rings, irridescent clouds, Brocken spectra, etc.; 7) extinction, absorption, scattering; 8) sky illumination during daytime and nighttime (albedo, twilight and night sky brightness, moonshine); 9) polarization of skylight; 10) theory of extinction, scattering and polarization of light and applications (Rayleigh and Mie theory); 11) twilight color phenomena (6 phases) and their explanation; 12) visibility (day, night, factors affecting visibility measurement, meteorological and climatological visibility). A bibliography, tables of constants, conversion factors and data of 9 types, source and subject indexes are included. The book is nicely bound and contains good illustrations, some in rich colors. It does not cover aurora, airglow and other luminescent photochemical phenomena. *Subject Headings:* **1. Atmospheric optics 2. Visibility 3. Refraction of light 4. Twilight phenomena 5. Atmospheric optics textbooks.**—*M.R.*

8.8-14 551.584(02):016

*†Geiger, Rudolf, **The climate near the ground.** A translation by Milroy N. Stewart and others of the 2nd German ed. of **Das Klima der Bodennahen Luftschicht.** With revisions and enlargements by the author. 2nd printing, rev. Pub. for Blue Hill Meteorological Observatory, Harvard University by the Harvard Univ. Press, **1957.** 494 p. 181 figs., 63 tables, bibliog. p. 415–444; supplementary bibliog. p. 445–472. Price: $6.00. **DWB, DLC**—This classic text has gone through several German editions and printings since 1927, and one English edition (1950). The present English edition has a number of corrections in the text, besides the original bibliography of 821 refs., and a bibliography (classified by chapters in the text) of over 400 additional references, including reference to 10 special bibliographies on various aspects of microclimatology which appeared in *MAB* (1950–56). The 41 chapters in the text deal with day and night heat exchange at the ground, ground or soil temperature, eddy diffusion, long wave radiation, warming and cooling at the ground, diurnal and annual course of surface temperature, temperature gradients near the ground, humidity, wind, optical, acoustical and chemical properties of surface air, influence of ground temperature, soil type and condition, air layer above water, above snow, sod, relation to topography, frost pockets, slope and valley and glacier winds, sunshine on slopes and its effect, cave micrometeorology, influence of plant cover on radiation temperature, humidity, wind, etc.; forest meteorology and climatology; radiation temperature; humidity, precipitation, etc. in old stands, clearings and cuttings and on the edge of the forest; microclimate and man, artificial influences on climate, city climates; resort, clothing and bed climates, air conditioning, stable and greenhouse climates and, finally, frost and frost protection. (*See* 2.1–158, Jan. 1951, *MAB*, for 1st English ed. and 4C–291, March 1953, *MAB*, for 3rd German ed.) *Subject Headings:* **1. Microclimatology textbooks 2. Microclimatology bibliographies 3. Forest climatology 4. Translations.**—*M.R.*

8.8–15 551.588.7(02)

†Kratzer, P. Albert, **Das Stadtklima.** [City climate.] 2d enl. ed. Brunswick, Vieweg, 1956. 184 p. 78 figs., tables, 563 refs. *Die Wissenschaft*, Brunswick, Vol. 90. **DWB.** Review by F. Steinhauser in *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 8(1):131–132, **1957. DLC**—Since the first edition (*see* 3G–170, July 1952, *MAB*) of this excellent little book came out in 1937, hundreds of articles have been published on various aspects of urban climatology, but no new books. Hence a complete and painstaking revision was necessary, and this has been accomplished by adding over 40 pages of text, 35 figures and over 300 references (many of them obtained from special bibliographies of C. E. P. Brooks in *MAB*, Vol. 3:734–773, 1952 and Vol. 5:1187–1230, 1954, as acknowledged in Introduction to 2nd edition). Thus the material condensed in the 9 chapters of the book has been more than doubled by adding 20% more pages and revising. The several chapters cover: I. city climate; II. historical; III. the city; IV. city air; V. radiation; VI. temperature; VII. wind; VIII. humidity and IX. precipitation. Besides the excellent bibliography of 563 references, there is a name (author and place) and a subject index. The literature is thoroughly reviewed and illustrative tables and graphs, maps and charts profusely scattered through each chapter or section of a chapter. Topographic, diurnal, weekly, monthly, and annual variations of meteorological elements; variations with height above sea level or valley; industrial effects; wind effects; effects of growth of cities, of pavements, buildings, pollution of various types; parks, railroads, organic matter; electrical (ion) variations; influence of surroundings; comfort, nuclei, etc., etc. are discussed. Examples are taken from cities in all parts of the earth—those used most frequently being Vienna, Paris, Berlin, Budapest, London, Munich and Nüremberg and fewer for New York, Stockholm, Frankfort, Hamburg, Leipzig, Köln, Los Angeles, Lyon and Stuttgart. *Subject Headings:* **1. Urban climates 2. Bibliography of urban climates 3. Urban influences.**—*M.R.*

8.8–16 551.509(02)

Krichak, O. G., **Sinopticheskaia meteorologiia.** [Synoptic meteorology.] Leningrad, Gidrometizdat, **1956.** 530 p. 295 figs., 12 tables.—A standard, up-to-date textbook for students of synoptic meteorology for practical use in courses in synoptic analyses and forecasting or aerological research and analysis. The 16 chapters cover organization, history and

development of synoptic service in USSR, including: 1) synoptic charts, 2) pressure (baric and isallobaric) fields, 3) air motions (wind), 4) convection, vertical motion, 5) charts of baric topography, 6) condensation, 7) general circulation, 8) air masses, 9) fronts, 10) pressure changes, 11) cyclones, 12) anticyclones, 13) cyclonic and anticyclonic activity (including tropopause changes), 14) short range and special forecasting, 15) long-range forecasting. Covered under short-range or special forecasting are: Par. 129) cloud forecasting, 130) ceiling height, 131) cloud top forecasting, 132) general precipitation, 133) shower and thunderstorm forecasting, 134) wind, 135) temperature, 136) frost, 137) fog 138) snowstorm or blizzard, 139) visibility, 140) glaze and ice, 140) single station forecasting. The long range and 3-day forecasting techniques are based entirely on the composite chart natural synoptic period-circulation type school of MUL'TANOVSKIĬ. The text is full of illustrative charts, cross sections, schematic diagrams, models, air mass or storm track charts, Northern Hemisphere mean charts, adiabatic diagrams (soundings), tables, nomograms, code specifications, etc., and synoptic case histories or examples for Eastern Europe or Eurasia. A good subject index is also included. *Subject Headings:* **1. Synoptic meteorology textbooks 2. Specialized forecasting techniques 3. Long range forecasting techniques.**—*M.R.*

8.8–17 551.5(02)(09)

†Neis, Bernhard, **Fortschritte in der Meteorologischen Forschung seit 1900.** [Progress in meteorological research since 1900.] Frankfurt a.M., Akademische Verlagsgesselschaft, **1956.** 238 p. figs., ports, tables, eqs. bibliog. at end of each ch. **DWB.** Review by C. E. P. Brooks in *Royal Meteorological Society, Quarterly Journal,* 38(356):282, April **1957. DWB**—This book is the outcome of a series of lectures given by the author (who died May 24, 1956 at age 74) during the winter of 1953/54 at the Berlin Freie Univ. The vast literature of a physical or quantitative nature is systematically reviewed for the period 1900–1956. The approach is by subject areas rather than chronological. The paths of development beginning with the general or basic scientific situation in research at the turn of the century is covered and the author goes on to discuss the increased understanding of the upper atmosphere resulting from balloon soundings, radiosondes and thermodynamic diagrams; the colloidal physics of the atmosphere, upper air, synoptic charts and research arising from extended networks of sounding stations, aerological analysis; wind and turbulence concepts; radiation measurements and knowledge of radiative balance, theory of the stratosphere and radiation inversions, kinetics of wind, friction; dynamic waves in the atmosphere; vorticity and energy transport, role of water vapor phase, electric, magnetic and auroral phenomena; general circulation models and meridional transport of energy, grosswetter types; forecasting and practical meteorology and, finally, climatology, agricultural meteorology, phenology, microclimatology, health resort climatology or bioclimatology. Representative literature or works from various countries are cited but the bulk (50–70%) of the research reported is by Germans or from German sources. A good name and a subject index is appended. A few line drawings or diagrams and photographs of 12 outstanding meteorologists constitute the illustrative material. Several fields of progress are not touched on at all: e.g., cloud seeding and cloud physics research in the U. S., extended and long range forecasting research of NAMIAS and associates, climatic changes, radar storm or precipitation detection, detailed studies of the albedo of different surfaces, etc. *Subject Headings:* **1. Progress in meteorology 2. History of meteorology 3. Biographical material 4. Textbooks.**—*M.R.*

8.8–18 551.5(02)

§Pogosian, Kh. P., **Ocherki ob atmosfere.** [Notes on the atmosphere.] Leningrad, Gidrometizdat, **1955.** 251 p. 96 figs., 15 tables. **DLC** (QC863.P685)—A simple practical text on meteorology slanted toward synoptic forecasting with numerous original schematic diagrams and charts, tables and data to give quantitative bases for knowledge of the various processes described, but no reference to source material. The 80 chapters are divided into 12 major headings: 1) the ocean of air (structure and composition); 2) solar energy (direct, diffuse, long wave, albedo, use of solar energy); 3) temperature distribution at surface of earth (diurnal, seasonal, zonal, ocean-continent variations); 4) air movements (zonal, monsoonal, seasonal, diurnal, vertical variations, use, pressure-temperature-wind relations); 5) vertical temperature changes (stability, etc.); 6) moisture exchange and precipitation over earth

(clouds, cloud physics, circulation of moisture, orographic influences, evaporation); 7) discontinuities and fronts; 8) cyclones and anticyclones, 9) weather forecasting and analysis, 10) local forecasting from signs and clouds, etc.; 11) artificial control of climate and 12) climatic changes (anomalies, geologic, recent changes in Caspian sea level). *Subject Headings:* **1. Meteorology textbooks 2. Synoptic meteorology textbooks 3. Meteorology.**—*M.R.*

TRANSLATIONS

See: **Climate near the ground** (Geiger), 8.8–14.

MONOGRAPHS AND OUTSTANDING PAPERS

See also: **Climatology, N.W. European waters** (Bullig, Bintig), 8.8–73.

8.8–19 551.510.42

*Air Pollution Foundation, Los Angeles, Calif., **Third Technical Progress Report, prepared by the Scientific Staff.** Its *Report* No. 17, i.e., 2(5), issued March **1957.** 110 p. tables, figs., refs., bibliog. p. 107–110. **DWB**—The work of the Air Pollution Foundation during 1956 was concentrated on the effects and control of automobile exhaust and incinerator fumes. The report contains 5 chaps.: I. General; II. Evaluation and control of sources of pollutants; III. Atmospheric-sampling instruments, air monitoring studies 1954–6, plant damage studies 1956; IV. Chemistry of polluted atmospheres; V. Lists of technical reports, bibliography of staff publications and other reports. Wind trajectory studies to determine paths of winds that most frequently bring air pollutants to the central business section, ozone forming processes and inversion studies in relation to oxidant concentration were made. It was found that the air producing smog passed near industrial areas or refineries on only a small percentage of smog days for downtown Los Angeles, and that auto exhaust and incinerator emissions were responsible for most of the hydrocarbon-eye irritation and oxidant concentration. *Subject Headings:* **1. Atmospheric pollution control studies 2. Oxidant concentration in air 3. Inversion-oxidant relationships 4. Air trajectory studies 5. Los Angeles, Calif.**—*M.R.*

8.8–20 551.510.534

Gowan, E. H.; Buckler, S. J. and Thompson, C. E., **Preliminary report on ozone changes 1950–1954 over Edmonton.** *Royal Meteorological Society, Canadian Branch [Publications]*, 7(2):37–65, Oct. 18, **1956.** 20 figs., table, 7 refs. **DWB**—An excellent analysis of ozone measurements made with a Dobson ozone spectrophotometer at Edmonton during Aug. 1950–1954 shows relations between ozone anomalies or changes and 500 mb troughs, ridges, Hudson Bay Lows and Alberta (cold) Lows. Composite seasonal charts show that increases or high values usually correspond with troughs, where subsidence is at a maximum or the region just upstream from the 500 mb trough where advection of air from the ozone rich region around 60°N is at a maximum and that O_3 minima occur in ridge areas or well in advance of troughs (also ridge areas), where advection is from the south. Cold Alberta lows are not associated with high O_3 values, as they are too small and transitory to allow much advection. Low tropopause seems to coincide with high O_3 values. Seasonal curves for Edmonton for 1951–54 seem to agree with those for Oxford (NORMAND) and for Bismarck (1953–54). The highest values occur in March–April and the lowest in Oct.–Nov. Umkehr calculations show greatest amounts in 5–20 km height range (.0078 cm/km). No significant advection could be shown between Edmonton and Bismarck, but data are limited. *Subject Headings:* **1. Ozone-500 mb height relationships 2. Ozone advection 3. Vertical ozone distribution 4. Seasonal ozone variations 5. Edmonton, Alberta 6. Bismarck, N. D.**—*M.R.*

8.8–21 551.509.67

†Pavelis, George A., **Agricultural implications of weather control.** *Montana. Agricultural Experiment Station, Bozeman, Mimeograph Circular*, No. 86, Jan. **1955.** 149 p. tables, footrefs., bibliog. (36 items). **DWB**—A thesis presented to the Graduate Faculty of Montana State College, Bozeman, and reproduced for wider dissemination because of the logical, thorough and comprehensive nature of the work. The 6 parts deal with: I. Problem in general; II. Methodology; III. Technology (meteorological basis, nuclei, Project Cirrus, Canadian

experiments); IV. Climatology; V. Economics; VI. Legal and governmental aspects and evaluation. The appendixes include sample weather maps for selected weather types, and seeding potentials for Montana stations. The cost and history data for numerous Montana experiments on cloud seeding in 1951–53 comprise the most valuable contribution. Probabilities of weather conditions (in many localities of Montana) favorable for cloud seeding during critical agricultural seasons, is found in Pt. IV (accompanied by a color map). *Subject Headings:* **1. Cloud seeding monographs 2. Cloud seeding in Montana 3. Montana.**—*M.R.*

8.8–22 551.582.2(791)

*Arizona. Agricultural Experiment Station, Tucson, **The climate of Arizona.** Its *Bulletin*, No. 279, Sept. **1956.** 99 p. 13 figs., 39 tables. **DWB** (M055 A719b)—The available climatic data for nearly 300 stations in Arizona are analyzed and compiled in numerous ways to show the overall climatic features, the details of temperature, precipitation, frost, snow, wind, sunshine, evaporation, relative humidity, etc. both for long periods (1892–1954) at a few stations and for shorter periods at the other stations. Text, including graphs, histograms, etc., is brief and to the point throughout. Tabular material is extensive but in very small type in some cases. Comparison is made with other places in the U. S. and abroad. Comfort climate, air conditioning, climate and health, climate and agriculture, forecasting, irrigation and floods are treated. *Subject Headings:* **1. Climate of Arizona 2. Climatic data for Arizona 3. Arizona.**—*M.R.*

8.8–23 551.582:63(43) 551.588.2

†Weischet, Wolfgang, **Die Geländeklimate der Niederrheinischen Bucht und ihrer Rahmenlandschaften: eine geographische Analyse subregionaler Klimadifferenzierungen.** [The agroclimate of the Lower Rhine Bend and its regional landscapes: a geographical analysis of subregional and climatic variations.] Kallmunz/Regensburg, Lassleben, **1955.** 169 p. 37 figs., 11 charts (in pocket), bibliog. p. 161–167. Price: DM 12. *Müncher Geographische Heft*, No. 8. **DLC** (QC989.G3R5). Review by H. G. Koch in *Petermanns Geographische Mitteilungen*, Gotha, 100 (4):300, **1956.** Review by J. Van Eimern in *Arch. f. Met., Geoph. und Biok., Ser. B*, 8(1):133–135, **1957. DLC**—This monograph contains a scholarly analytical discussion of the Lower Rhine Region, its topography (as it affects climate) and its topoclimate, based on phenological data and evidence from tree deformation, vegetation conditions and other material obtained by the author on excursions throughout his native region in 1950, 1951 and 1952. Temperature and wind, precipitation and cloudiness are the meteorological variables which are discussed in connection with their effects on subregional vegetation types. A great deal of erudite discussion of the problem of regional vs. local climatology is presented in support of this type of analysis, i.e., the subregional, which is intended to bring the gap between the large scale and small scale geographic approach. Many colored phenological charts are appended. Very little quantitative meteorological data are incorporated though several wind profile cross sections are included and a number of local or microclimatic studies referred to. *Subject Headings:* **1. Subregional climatology 2. Regional climatology 3. Topoclimatology 4. Climate of Lower Rhine 5. Phenological charts 6. Lower Rhine, Germany.**—*M.R.*

8.8–24 551.506(261.2):627.92

*Netherlands. Meteorologisch Instituut, **Meteorologische en oceanografische waarnemingen verricht aan boord van Nederlandse lichtschepen in de Noordzee, Jaargang 6, 1954.** [Meteorological and oceanographical observations taken from the Netherlands lightships in the North Sea, 6th year, 1954.] De Bilt, **1956.** 20 p. numerous tables. **DWB** (M07.2 N469m)—A handy compilation of monthly and annual averages or frequencies of meteorological and oceanographic data from the 4 Dutch lightships: "Noord Hinder," "Goeree," "Texes" and "Terschellingerbank" (51°39′ to 53°30′, and 2°34′ to 5°08′E) during 1954, at the 6, 3-hourly or hourly intervals prescribed. Tables include air (dry and wet bulb) temperature, sea surface temperature, direction and force of wind, weather, visibility, pressure, duration of fogs and precipitation for each day; direction, period and height of waves; sky cover; tides; frequency of air-sea temperature, of wind force and of wave heights. *Subject Headings:* **1. Lightship observations 2. Annual marine meteorological data summaries 3. Netherlands lightships 4. North Sea 5. Netherlands.**—*M.R.*

8.8–25 551.553.8 551.506(261.2):627.92

*Verploegh, G., **Klimatologische gegevens van de Nederlandse lichtschepen over de periode 1910–1950, Deel 1, Stormstatistieken.** [Climatological data of the Netherlands lightships over the period, 1910–1940, Pt. 1, Statistics of gales.] *Netherlands. Meteorologisch Instituut, Mededeelingen en Verhandlingen (Ser. A)*, No. 67, **1956.** 68 p. numerous tables. t-p. and text in Dutch and English. **DLC, DWB** (M055 N469m)—A nice compilation of the number of gales of specified duration (in watches) of force 7, 8, 9 and 10 from the NE, SE, SW and NW, and all quadrants for each separate month and for the year, at 7 Dutch lightships from 51°37′ to 65°00′N (Noord Hinder to Doggersbank Noord) and with records from 4 to 27 yrs in length. Methodology is completely covered in introduction. Supplementary tables give numbers and durations of gales exceeding a given force, and variation from year to year in each month (1909–40) at each lightship. *Subject Headings:* **1. Gale statistics 2. Lightship observations 3. Netherlands lightships 4. Netherlands 5. North Sea.**—*M.R.*

8.8–26 551.526.6(261)

*Riehl, Herbert, **Sea surface temperatures of the North Atlantic, 1887–1936.** Chicago. Univ. Dept. of Meteorology, Contract N6ori-02036, Report on Research (unnumbered), Jan. **1956.** 9 p. 11 figs., almost entirely charts. **DWB** (M26.6 R555s) –Monthly charts of ocean temperatures over the N. Atlantic from Jan. 1888 to Dec. 1936 give data (for each 5° square) on the departure from "normal" to whole degrees Fahrenheit based on seasonally "smoothed" data. Long period, semiperiodic variations or trends are shown, and these trends vary with latitude and longitude. Some charts of annual anomaly are presented, showing anomaly centers that seem to be connected with general circulation anomalies and with changes in frequency and path of hurricanes as shown in a number of analytical charts. *Subject Headings:* **1. Sea surface temperature charts 2. Hurricane tracks-sea surface temperature relationships 3. Sea surface temperature trends 4. North Atlantic.**—*M.R.*

8.8–27 551.515.4

*World Meteorological Organization, **World distribution of thunderstorm days, Pt. 2, Tables of marine data and world maps.** Its *WMO/OMM*, No. 21, Technical Publication, No. 21, **1956.** 71 p. 18 maps (fold.), numerous tables. t-p. and legends in English and French. Price: Sw. fr. 9. **DWB** (M06 W927p)—Monthly, seasonal and annual charts of the world showing isolines of average number of thunderstorm days are presented, based on data contained in extensive tables for 5° squares compiled from marine data by the British Meteorological Office and the Deutscher Wetterdienst. This marine data was used to supplement the data for land stations compiled in Pt. 1 (WM021 TP6). About 6 million ships observations were used in this report. Smoothing and computing techniques (C. E. P. Brooks) are outlined. The number of observations used for each 5° square is also given. (For Pt. 1, Tables, see 6.3–10, March 1955, *MAB.*) *Subject Headings:* **1. Thunderstorm frequency data 2. Global thunderstorm distribution. I. Brooks, C. E. P.**—*M.R.*

8.8–28 551.578.11:551.501.81

*Jones, Douglas M. A., **Rainfall drop size-distribution and radar reflectivity.** Illinois. State Water Survey. Meteorologic Laboratory, Univ. of Illinois, Contract DA-36-039-Sc-64723, Project Sc-172B, Research Report, No. 6, April **1956.** 20 p. 12 figs., 3 tables, 16 refs., 19 eqs. **DWB** (M055 I29r)—In order to study the relationship between drop size and radar reflectivity for heavy rains (thundershowers), a special telescopic raindrop camera was constructed to take pictures of drops at high speed. A total of 1211 observations was made in 45 storms in Illinois during July 1953 to Jan. 1955. Rates as high as 157 mm (>6″) an hour and as low as .004 mm/hr were calculated from photographs. Observations represented hailstorms, thunderstorms, high level thunderstorms and showers, and winds ranged from 0 to 50 mph. Drops ranged from 0.5 to 9 mm diameter. Data are given in tables and graphs and the drop size distribution vs. radar reflectivity worked out. A general Z-R relationship of $Z=396\ R^{1.35}$ was obtained where R is rate of rainfall in mm/hr, and $Z=\Sigma Nd^6$ in mm^6m^{-3}. For thundershowers the relationship was $Z=486\ R^{1.37}$, and for rainshowers $Z=380\ R^{1.24}$ and for continuous rain $Z=313\ R^{1.25}$. The higher rates cause relationships to be nonlinear on log-log paper. Drop size increases, as a rule, when rate of rainfall increases and vice versa.

Liquid water content (W) and median diameter are related to rainfall rate as $W=.052\ R^{.97}$ and $d_{50}=0.80\ R^{0.34}$. Other relationships are worked out and equipment described and illustrated. Variability within a storm and from storm to storm limits accuracy of radar observations of rainfall rates. *Subject Headings:* **1. Raindrop size distribution 2. Radar precipitation echoes 3. Urbana, Ill.**—*M.R.*

8.8–29 551.515.21

Palmén, E. and Riehl, Herbert, **Budget of angular momentum and energy in tropical cyclones.** *Journal of Meteorology*, 14(2):150–159, April **1957.** 12 figs., 9 tables, 13 refs., 25 eqs. **DWB**—The surface stress in tropical storms is computed as a function of the radius, from mean wind data in the troposphere. If only the symmetrical part of the circulation is considered, the stress ranges from 1 dyne per square centimeter in the outskirts to 20 dy/cm² at a distance of 1 degree latitude from the center. Inclusion of the mean asymmetry of the wind field, resulting from superposition of steering current and vortex, yields values about 20% higher. The absolute angular momentum budget shows that most net inward momentum transport is carried by the symmetrical part of the circulation near the core, and that the asymmetrical part contributes up to 50% at a distance of 6 deg lat from the center. Calculation of the angular momentum transport due to the earth's rotation in inflow and outflow layers shows that the vertical momentum transport is directed upward everywhere; outside the 2-deg radius, this transport is accomplished by eddies. Generation and dissipation of kinetic energy are calculated. The generation depends on the vertical correlation between radial flow component and pressure gradient which, for production of kinetic energy, must be positive, i.e., the strongest inflow must occur at the strongest inward directed pressure gradient. This shows that kinetic energy production within the cyclone can take place only if the cyclone is of the warm core type. Next, the importance of a local heat source at the ocean surface for production of the observed inward warming in the rain area is discussed, and a relation between the local heat source and the central pressure is given. A general energy balance shows that about 3% of the latent heat released is converted to kinetic energy, and that a considerable export of potential plus internal energy takes place from tropical storms. *Subject Heading:* **1. Tropical cyclone dynamics.**—*Authors' abstract.*

8.8–30 551.558.1:536.2

Priestley, C. H. B., **Convection from the earth's surface.** *Royal Society of London, Proceedings, Ser. A.*, 238(1214):287–304, Jan. 8, **1957.** 4 figs., 2 tables, 21 refs., 30 eqs. **DWB**—The nonlinear temperature profile which obtains in the lowest 20 or 30 m over heated ground allows convection plumes, once formed, to maintain themselves in existence without any preferred heat supply. These plumes should form in general as elongated strips oriented downwind, their average section becoming more nearly circular as the negative Richardson number, $|Ri|$, increases. The heat flux H from a large area, by the agency of plumes of this type, is shown to satisfy the theoretical law (Priestley 1954) of free convection,

$$H \alpha \rho c_p \left(\frac{g}{T}\right)^{\frac{1}{2}} z^2 \left|\frac{\partial T}{\partial z}+\Gamma\right|^{\frac{3}{2}}$$

with a constant of proportionality which conforms to the observed value (T is the temperature at height z and Γ the adiabatic lapse rate). The observed validity of the above law in conditions of quite appreciable wind is at the same time explained. The value $-Ri=0.011$ is deduced from theory as indicative of that at which free convection should begin to compete with forced convection as an effective agent of heat transfer, and it should become dominant at a value not many times greater. This supports the indications from earlier experiments. Various other lines of evidence confirm the reality of the plume models. *Subject Heading:* **1. Convection above heated ground.**—*Author's abstract.*

8.8–31 551.511.2:551.513.2

Van Mieghem, Jacques, **Réflexions sur le transport et la production du moment et de l'énergie cinetiques dans l'atmosphère et sur l'existence de circulations méridiennes moyennes.** [Comments on kinetic momentum and energy production and transfer in the atmosphere

and on the existence of mean meridional circulation.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 29(2):55–82, **1956.** 40 refs., 20 eqs. German, English and French summaries p. 55–56. **DWB** —Analysis of and comments on recent work with a critical comparison of the results. The following main points are examined: the selective effect of the eddies of different sizes on the correlations between meteorological variables of state and motion, in particular on the momentum transport and on the energy transport and production; the consequences of the continuity equation form assumed by the equation of zonal motion; angular momentum transport occurring in mean meridional circulations and in large- and small-scale eddies; a necessary condition for the existence of a mean meridional circulation; the relation between the eddy transport of angular momentum in meridional planes and the mean meridional circulations; the influence of the inertial stability on mean meridional circulations; the kinetic energy transfer from the eddy motion to the mean flow; the balance form of the equation of mechanical energy and its consequences; the dangers of the geostrophic hypothesis and the assumption of incompressibility; the predominance of the conversion of potential energy into kinetic energy; the influence of cyclogenesis and anticyclogenesis on the production of kinetic energy; the barotropic and baroclinic energy processes; the energy processes maintaining the large disturbances and the mean zonal circulation. It is concluded that, in the general circulation of the atmosphere, the eddy motions play the primary role, the mean meridional circulations being only secondary features. *Subject Headings:* **1. General circulation 2. Eddy motion 3. Meridional circulation.**—*Author's abstract.*

MANUALS AND ATLASES

See also: **Climatology, N.W. European waters** (Bullig, Bintig), 8.8–73; **Optimum flight planning manuals** (U.S.A.W.S.), 8.8–82; **Radioactive fallout manuals,** 8.8–113; **Observers manuals** (Japan. Central Met. Obs.), 8.8–123; **Hong Kong forecasters manual** (Ramage), 8.8–172.

8.8–32 551.501.1(02)

Canada. Meteorological Div., **MANOBS. Manual of Standard procedures and practices for weather observing and reporting.** 4th ed. 224 p. Its *CIR*-2857, OBS-265, Jan. 1, **1957.** Price: **$1.25. DWB** (M01.1 C212ma)—This manual is a reprint of the 3rd ed. but with all changes appearing since the 3rd ed. incorporated, and a few revisions made in arrangement. New procedures of WMO are also included. It prescribes standard procedures for the Meteorological Service of Canada, and is considered authoritative. Chapters cover: I. General, II. Surface Observations, III. Sky, IV. Visibility, V. Atmospheric Phenomena, VI. Pressure, VII. Temperature, VIII. Humidity, IX. Wind, X. Aviation reports, XI. Synoptic Reports, XII. Pilot reports, XIII. Aero reports, XIV. Wind forms, XV. Pibal observations and reports and XVI. Sunshine records. Sample records and a subject index are appended. The manual is effective Jan. 1, 1957. *Subject Headings:* **1. Instructions for observers 2. Observers manuals 3. MANOBS.**—*M.R.*

8.8–33 551.582.3(43)

*Germany. Deutscher Wetterdienst, **Klima-Atlas von Rheinland-Pfalz.** [Climatic atlas of the Rheinland-Pfalz.] Bad Kissingen, **1957.** 37 p. of text. 84 p. mostly charts (in color). looseleaf. **DWB**—"5th in the series of 'Atlanten' climate of the German States." A looseleaf atlas giving in many colors with nice cartography, the essential climatic data for the mountainous region bordering the Rhine between Karlsruhe and Dusseldorf (S.–N.) and Aachen-Wiesbaden (W.–E.). Frankfurt a.M. is just to the E. of the edge of the maps. The mean values for wind, temperature, relative humidity, sunshine duration, precipitation, thunderstorms, cloudiness, fog, snowfall, snow depth; phenology of apples, potatoes, snowbells, rye, hay, etc.; growing season and for the earliest and latest dates of various low or high temperatures, the temperature and snow conditions of "good" or "bad" winters, etc. are portrayed by carefully drawn isolines or, in a few cases, by diagrams. The format and workmanship are of the same order as was the case in those previously issued under the guidance of K. Knoch for Hesse (1950), Bavaria (1952) and Baden-Württemberg (1953). The data for the 55 charts are based on records for 1881–1930; charts are on a scale of 1:1 million. Topographic

and regional geographic charts are included. (For Hesse, *see* 2C–177, March, 1951, *MAB*; Bavaria, 4.2–4, Feb. 1953, *MAB*; Baden-Württemberg, 5.7–4, July 1954, *MAB*.) The diagrams give temperature anomalies for each month from 1881–1940; highest and lowest daily mean temperature for Kaiserslautern (1901–40); soil temperature for Bernkastel-Kues; precipitation variations during the growing season and year; frequency (scatter) of monthly precipitation at 6 stations, precipitation for each month of each year at 7 stations (1901–40), and snow cover at a score of stations for 1936/7 and 1941/2. Ample explanations of the charts are included in a large full-size 37-page supplement. *Subject Headings:* **1. Climatic atlases 2. Climatic charts 3. Climate of Rhineland-Pfalz, Germany 4. Rhineland-Pfalz, Germany. I. Knoch, K.**—*M.R.*

8.8–34 551.582.3(262) 551.46(262)

*Netherlands. Meteorologisch Instituut, **Middellandse Zee: oceanografische en meteorologische gegevens.** [The Mediterranean: oceanographic and meteorological data.] 'S-Gravenhage, **1957.** Price: 20 F. xix+91 p. numerous charts. T-p. and legends in Dutch and English. **DWB** (M82.3/262 N469m)—Monthly charts of general air circulation, sea currents, air pressure, air and sea temperature, fog and precipitation, wind and current roses are presented and discussed. Cloudiness and gale frequencies are also discussed. Each chart contains data for 10 squares and, in some cases, isolines. The number of observations on which the averages or frequencies are based is given for each square. All ship observations available at the Netherlands Meteorological Institute and at the British Meteorological Office, the Deutsches Hydrographic Institute, the Swedish and the Israel Meteorological Service were used. Over 3 million punched cards were summarized. Twelve charts are included for use in further studies of the climate of the Mediterranean. Curves showing diurnal and annual variations in air pressure and air and sea temperature for different sectors are presented. *Subject Headings:* **1. Marine climatic atlases 2. Marine meteorological data 3. Mediterranean Sea. I. van Duijnen Montijn, J. A. II. Heyna, B.**—*M.R.*

8.8–35 551.576.12:061.3

International Cloud Atlas, Vol. 2 [Plates]. Geneva, World Meteorological Organization, **1956.** 224 plates (123 in black and white; 101 in color)+15 p. (appendix). **DWB** (M76.1 I61)—Contributions for this monumental work came from weather services all over the world. Each of the more than 200 plates is fully annotated as to cloud type, source, date, direction, circumstances and place of photography, cloud code (lower, middle and upper) for each cloud element, synoptic conditions, etc. In the appendix the plates are listed according to cloud type and to numerical order. Clouds seen from aircraft, special cloud types (such as nacreous or lee clouds), fog, smoke halos, phenomena, snow, waterspouts, sand, crepuscular rays, haze, rainbow, rime, volcanic clouds, contrails, tropical cyclones, cloud maps, roll clouds, rocket photograph of clouds, waterfall clouds, and many other imaginative forms have been included in this completely revised and "unabridged" atlas. This publication (in its various forms of issue) replaces the former **International Atlas on Clouds and Types of Sky,** the last edition of which appeared in 1939. *Subject Headings:* **1. Cloud atlases 2. International cloud atlas. I. World Meteorological Organization.**—*M.R.*

GENERAL GEOPHYSICS AND METEOROLOGY

IGY

See also: **Operation Deepfreeze I** (Foster), 8.8–46.

8.8–36 551.465(261):550.3:061.3

Dietrich, G., **Der deutsche Beitrag zu den ozeanographischen Arbeiten im Internationalen Geophysikalischen Jahr 1957/58.** [The German contribution to the oceanographical work of the IGY 1957/58.] *Wetterlotse*, No. 114/115: 57–62, March **1957. DLC**—In oceanography there are 5 main problems for the IGY, but German work is being concentrated on polar fronts in the Atlantic north of 40°N with the "Gauss" and "Anton Dohrn." The Gulf Stream in

mid-Atlantic is very little known; the German contribution will be the configuration of the ocean floor, surface currents, deep and bottom circulation. *Subject Headings:* **1. IGY oceanography program 2. German participation in IGY 3. Oceanographic research 4. Gulf Stream.**—*C.E.P.B.*

8.8–37 523.5

Hoppe, J., **Das internationale Geophysikalische Jahr, V, Neues von den Meteoren.** [The IGY: Pt. 5, New facts about meteors.] *Umschau*, 57(9):263–265, May 1, **1957.** 3 figs., 13 refs. **DLC**—A general description of meteors is given, including source of light and ionization channel which reflects radar. Most of the energy goes into ionization and becomes free on recombination, accounting for part of visible trail. "Fireballs" are compared with meteorites. The part played by radar in meteor investigation is emphasized, including determinations of air density and wind. *Subject Heading:* **1. Meteor research.**—*C.E.P.B.*

8.8–38 551.594.5:778.3

Stoffregen, Willy (*Upsala Jonosfärobservatorium, Sec. of Res. Inst. of National Defence, Stockholm*), **All-sky camera auroral research during the third Geophysical Year 1957–58.** *Tellus*, Stockholm, 7(4):509–517, Nov. **1955.** 9 figs. (incl. photos), 2 refs. **DWB, DLC**—A newly developed all sky or wide angle lens camera for photography of aurora is to be used at 5 stations in northern Scandinavia (Tromsö, Abisko, Malmberget, Alvsbyn and Lycksele) during the IGY. The photographs taken on 16 mm film at the rate of 1 exposure of 7 sec per min, for 12 hrs a day (average) during Sept.–April, will use 5000 m of film a year (for 6 stations). These observations will be supplemented by visual observations, especially in southern Sweden, and ionospheric records made at Tromsö, Oslo, Kiruna, Lulea, Lycksele and Upsala. The camera, records, sample photographs, field installations and plans for coordination are described and illustrated. *Subject Headings:* **1. Auroral photography 2. Auroral photography networks 3. IGY networks 4. All-sky auroral cameras 5. Scandinavia.** —*M.R.*

8.8–39 551.5945.

Paton, James, **Polar and tropical aurorae.** *Endeavour*, London, 16(61):42–46, Jan. **1957.** 5 photos, 11 refs. **DLC**—A general discussion, with fine illustrations, of the occurrence and theories as to the cause of the airglow, the polar aurora and the tropical aurora, and methods of observation and photography. Special attention is paid to the IGY auroral program. *Subject Headings:* **1. Auroras 2. IGY auroral program.**—*M.R.*

8.8–40 550.3:061.3

Schneider, Otto, **A propósito del Año Geofisico Internacional.** [International Geophysical Year.] *Meteoros*, Buenos Aires, 5(3):207–210, July/Sept. **1955.** 2 figs., table, ref. **DWB, DPU**—The existing deficiencies of data on terrestrial physics are discussed. Graphs showing the distribution with latitude of geomagnetic data expressed as number of year observations for each million sq km (1939), the distribution of geomagnetic observations with latitude expressed in years observations for each million sq km of land and the distribution of gravimetrical observations are presented. The IGY program for obtaining data on terrestrial physics is outlined. *Subject Headings:* **1. Terrestrial physics 2. International Geophysical Year program.**—*I.L.D.*

8.8–41 550.3:061.3

Sobolev, L. G., **Podgotovka k proedeniiu Mezhdunarodnogo geofizicheskogo goda.** [Preparations for the International Geophysical Year.] *Meteorologiia i Gidrologiia*, Leningrad, No. 5:68–69, Sept./Oct. **1955. DWB, DLC**—The author lists the Committee on the International Geophysical Year established in the Academy of Sciences of the U.S.S.R., Soviet institutions participating in the IGY and the various problems to be investigated and discusses the general program of the IGY. *Subject Headings:* **1. International Geophysical Year, 1957–58 2. Russian participation in IGY 3. IGY program 3. U.S.S.R.**—*I.L.D.*

8.8–42 551.5:550.3:061.3

Wexler, Harry, **Meteorology in the International Geophysical Year.** *Scientific Monthly*, Wash., D. C., 84(3):141–145, March **1957.** fig., ref. **DWB, DLC**—Elements of the radiation balance of the earth, energy transport from tropics to polar regions, relation of ocean currents and energy exchange between atmosphere and sea, role of upper atmosphere, cosmic rays, the Antarctic, glaciers, snow cover, effect of small changes in solar radiation on earth, sea and air, climatic changes and, finally, changes in atmospheric composition are discussed for the general information of scientists in other fields. *Subject Headings:* **1. International Geophysical Year research 2. Energy balance of earth.**—*M.R.*

ARCTIC RESEARCH

See also: **Upper wind computation, Arctic** (Keegan), 8.8–125; **Air-borne ionosphere measurement, N. Pole** (Gassmann), 8.8–191.

8.8–43 551.501.9

Dege, Wilhelm (*Angelmodde*), **Jan Mayen wärend des Krieges.** [Jan Mayen during the war.] *Polarforschung*, Kiel, Ser. 3, 22(1/2):192–193, 1952, pub. **1954.** 2 refs. **DWB**—The German Weather Service in Norway was paralyzed 3 times in late summer (1940) by the Norwegian ship "Fridtjof Nansen." In Sept. 1940 the German radio installations and weather service were destroyed. A new meteorological expedition of the Germans to man the island was captured by another ship. In March 1941 the island was taken over by the Allies who organized their own weather station with 3 meteorologists on a remote mountain. *Subject Headings:* **1. Weather stations 2. Jan Mayen.**—*A.M.P.*

8.8–44 551.525.4:551.311.17(988)

Heuberger, Jean-Charles (*Shell Co., Maracaibo, Venezuela*), **Mesures de temperatures dans l'Ice-Cap du Groenland.** [Temperature measurements in the Greenland Ice Cap.] *Geofisica Pura e Applicata*, Milan, 34:71–73, **1956.** French and English summaries p. 70. **DLC**—In the drilled holes of Camp VI and "Station Centrale," temperature surveys were run during the 1950 expedition of "French Polar Expeditions 1948–1951" (Missions Paul-Emile Victor). The measurements not being in agreement with those made by the A. Wegener "German Expedition to Greenland 1930–1931," KURT WEGENER, in **Die Temperatür in Grönländischen Inlandeis** (*see* 7.8–166, Sept. 1956, *MAB*), comments on the results and, using the results of both expeditions, gives the temperature distribution in the Greenland Ice-Cap. The purpose of the present report is to justify the 1950 surveys, to state the reading accuracy and to find out the causes of the divergences between the results of both expeditions. *Subject Headings:* **1. Inland ice temperatures 2. Greenland Ice Cap.**—*From author's abstract.*

8.8–45 551.513.2:551.557(98)

Lee, Roy and Godson, Warren L., **The Arctic stratospheric jet stream during the winter of 1955–1956.** *Journal of Meteorology*, 14(2):126–135, April **1957.** 7 figs., 11 refs. **DWB**—Observed winds and temperatures above 40,000 ft, 60–140°W for winter 1955–56 are analyzed. The temperature at 100 mb was nearly uniform in Oct. but after onset of polar night at 20 km at Alert an increasing N-S gradient developed. Associated jet stream formed in far north in Nov. and moved slowly south in Dec. to south of 75°N, increasing in strength. Periodic temperature fluctuations in the south are interpreted as waves in the baroclinic zone below the jet stream. Three vertical cross sections of Arctic stratospheric jet stream are shown. It is probably due to differential solar heating of the ozone layer. *Subject Headings:* **1. Arctic jet stream 2. Arctic.**—*C.E.P.B.*

ANTARCTIC RESEARCH

8.8–46 91.04(99)

Foster, M. J. N., **Operation Deepfreeze I.** *Geographical Journal*, 123(1):1–11, March **1957.** 4 figs., 6 photos. Discussion p. 11–12. **DWB**—Description of U. S. Navy expeditions to establish IGY bases at Little America and McMurdo Sound in 1955–56, ice conditions and

flights. *Subject Headings:* **1. Antarctic expeditions 2. Operation Deepfreeze I 3. International Geophysical Year, 1957–58 4. Antarctica.**—*C.E.P.B.*

8.8–47 550.385:551.510.535(99)

Luchet, Aimé, **Sur la comparaison des enregistrements des valeurs de la composante horizontale magnétique du champ terrestre (indice K) a Kerguelen et Heard Island.** [Comparison of recorded values of the horizontal component of the geomagnetic field (K index) at Kerguelen and Heard Island.] *Académie des Sciences, Paris, Comptes Rendus,* 241(6):569–571, Aug. 8, **1955.** 2 figs. **DLC**—Variations of the horizontal component of the geomagnetic field measured by a unit of the French air force at Kerguelen Island (Port-aux-Français, March–Dec. 1954) are compared with those measured by the Australian National Antarctic Research Expeditions at Heard Island (March–Sept. 1954); those for Kerguelen show generally higher values. The correlation coefficient between the two series is close to 0.7. Magnetic activity is found to be particularly strong in the equinoctial periods. Strong magnetic variations were found to be accompanied by extremely unstable ionospheric conditions. The F2 region is diffuse and turbulent with rapidly varying and discontinuous critical frequency; at the E region level auroral layers appear. *Subject Headings:* **1. Geomagnetic disturbances 2. Ionospheric disturbances 3. Kerguelen Island 4. Heard Island.**—*G.T.*

8.8–48 551.311.17(99)

Shumskiĭ, P. A., **Glaciological and geomorphological reconnaissance in the Antarctic in 1956.** *Journal of Glaciology,* 3(21):56–61, March **1957.** 7 figs. English and German summaries p. 56. **DWB**—A preliminary account of the glaciological observations of the Antarctic Expedition of the U.S.S.R. Academy of Sciences in 86–102°E. Almost all coast is ice-covered except "Bunger's Oasis" in Queen Mary Land. Inland ice is up to 2400 m thick but edge is only 200–300 m though solid precipitation generally exceeds ablation. Bunger's Oasis is due to solar heat warming dark rocks; it was at one time ice-covered but has existed for at least 10,000 yrs. *Subject Headings:* **1. Inland ice 2. Bunger's Oasis, Queen Mary Coast 3. Antarctica.**—*C.E.P.B.*

SERVICES, INSTITUTIONS AND OBSERVATORIES

See also: **Mid-Pacific Reg. Meeting of A.M.S.** (Austin), 8.8–57; **Hist. of U. S. Navy Hydrographic Off.** (Bates), 8.8–58; **Hist. of Brit. Met. Off.** (Gregory), 8.8–59; **Met. instrument platform, Prague Astron. Obs.** (Segal), 8.8–133; **Frost warning serv., W. Germany** (Wegelben), 8.8–174; **Fed.-State Frost Warning Serv., Florida** (Johnson, Russell), 8.8–176; **Ebro Obs.** (Oriol Gardus), 8.8–194.

8.8–49 550.381

Finch, H. F., **Royal Greenwich Observatory, Hartland.** *Nature,* London, 179(4568):994–995, May 18, **1957. DWB**—An account of early observations of magnetic declination is followed by a history of the Greenwich Magnetic Observatory since 1838. Electrification of local railways caused removal to Abinger in Surrey, but extension of electrification has again interfered and observatory is being transferred to Hartland, N. Devon. *Subject Headings:* **1. Magnetic observatories 2. Greenwich, Eng.**—*C.E.P.B.*

8.8–50 551.5:061.1(47)

Kashin, K. I., **20-letie Tsentral'nogo Instituta Prognozov.** [20th anniversary of the Central Forecasting Institute.] *Meteorologiia i Gidrologiia,* No. 4:3–11, April **1956.** Also: Aujeszky, L., **A moszkvai Kozponti Prognosztikai Intézet húsz évi munkája.** *Időjárás,* Budapest, 60(5):311–312, Sept./Oct. **1956. DWB, DLC**—A very detailed account of the research and the theoretical and practical work on meteorological and hydrological forecasting carried out at the Central Institute for Forecasting since its establishment in Jan. 1936 at the Central Weather Institute. The specific type of work carried out is described and the individuals engaged in it are listed. In 1938, construction and systematic use of baric topography and research on the forecasting of baric poles were begun. The aerological observatory was established in 1940. Fronts and frontal weather were studied in connection with short range

forecasting; KIBEL'S method of making a 24-hr forecast of temperature, pressure and wind was introduced. A special section on aviation meteorology was established in 1948. The work of the geophysical observatory is described. The work in agriculture and hydrologic forecasting, long range forecasting, etc. is included. The article in *Idojárás* is a summary of KASHIN'S paper. *Subject Headings:* **1. U.S.S.R. Central Institute for Forecasting 2. Weather forecasting.**—*I.L.D.*

8.8–51 551.5:061.1(058):019.941

Manley, Gordon, **The Meteorological Office Report for 1955–56.** *Nature*, London, 179(4563):765–766, April 13, **1957. DWB**—Review of Annual Report of the Director. The developments of the past 50 years, especially of research, are briefly summarized. *Subject Headings:* **1. Annual service reports 2. British Meteorological Office.**—*C.E.P.B.*

8.8–52 551.5:061.1:628.8

Veryard, R. G., **Can the Meteorological Office help you?** *Institution of Heating and Ventilating Engineers, Journal*, 24:309–335, Nov. **1956.** 17 figs., 5 tables, 11 refs. Discussion p. 335–342. **DLC**—The organization of the British Meteorological Office and the work and services of the Climatological Services Division are outlined, including use of Hollerith cards. Examples of temperature data for use by heating and ventilating engineers are given and use in calculating fuel consumption described. Author then goes into radiation exchange. A large number of points were raised in the discussion. *Subject Headings:* **1. Meteorological services 2. Heating and ventilating.**—*C.E.P.B.*

8.8–53 551.556.2:551.508.5

Scultetus, Hans Robert, **Ausrüstung und Arbeitsweise des Windschutzmesszuges Nordrhein-Westfalen.** [Equipment and techniques of the North Rhine Westphalia wind protection mobile station.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 2(14):148–153 **1955.** 3 figs. **DWB**—This description of the activities of the wind protection measurement service of the Nordrhein-Westfalen includes an outline of the practical wind protection consultation service, basic microclimatic research and instrumentation needed for wind protection studies, and describes in detail the planning and execution of wind protection studies. *Subject Headings:* **1. Wind protection 2. Wind instruments 3. Germany.**—*I.L.D.*

SYMPOSIA AND CONFERENCES

See also: **Snow res. symposia,** 8.8–2; **Long range forecasting seminars,** 8.8–3; **Air conditioning and heating symposia,** 8.8–4; **Solar eclipses and ionosphere symposia,** 8.8–5; **Symposia on fluid models in geophysics** (U. S. Off. of Naval Res.), 8.8–6.

8.8–54 551.579(08)

Allard, W.; Ineson, J.; King, W. B. R. and Rangeley, W. R., **Hydrology: Darcy symposia.** *Nature*, London, 179(4556):407–408, Feb. 23, **1957. DWB**—Account of meeting of International Association of Scientific Hydrology at Dijon, Sept. 20–26, 1956, centenary of **Les fontaines publiques de Dijon** by HENRI DARCY. Six papers stressed importance of evaporation and evapotranspiration; a Working Committee was formed to prepare program for Toronto in Sept. 1957. The section on underground water was largely concerned with validity and applications of Darcy's Law, and more widely with underground water movement. The third section, floods, included hydrometeorological studies, flood discharges, erosion, hydraulics and forecasting. *Subject Headings:* **1. Hydrology 2. Symposia.**—*C.E.P.B.*

8.8–55 551.510.42:57

Hyde, H. A., **Aerobiology.** *Nature*, London, 179(4566):890–892, May 4, **1957.** ref **DWB**—Account of symposium at Linnean Soc., London, Feb. 21, 1957. J. M. HIRST (Rothamsted) spoke on spore traps. H. A. HYDE described results of a 15-year census of pollen grains and mould spores, L. R. TAYLOR temporal and height variations of aphid density. R. C. RAINEY considered effects of air movements, especially turbulence, on adult locusts

L. OGILVIE referred to observations of black rust on wheat and P. K. C. AUSTWICK to indoor conveyance of pathogenic airborne fungi. *Subject Heading:* **1. Aerobiology.**—*C.E.P.B.*

8.8–56 550.3:06

Model, Fr., **Meteorologen-Geophysiker-Tagung 1956 in Hamburg.** [Meteorological and Geophysical Meeting, 1956 in Hamburg.] *Deutsche Hydrographische Zeitschrift*, 9(5):250–251, **1956. DWB**—A short account of meeting of Sept. 25–29. Papers dealt with sea ice and several aspects of dynamic oceanography including wind action. *Subject Heading:* **1. Geophysical conferences.**—*C.E.P.B.*

8.8–57 551.5:061.3

Austin, Thomas S., **Report on first Mid-Pacific Regional Meeting of American Meteorological Society.** *American Geophysical Union, Transactions*, 37(4):526, April **1956. DWB, DLC, NRL, DGL**—Contains a list of the regional committee members that were elected at the Annual Fall Meeting held in Portland, Ore., Nov. 17–18, 1955. *Subject Heading:* **1. American Meteorological Society meetings.**—*I.L.D.*

EDUCATION, HISTORY AND BIOGRAPHY

HISTORY

See also: **Progress in met.** (Neis), 8.8–17; **Hist. of Greenwich Magnetic Obs.** (Finch), 8.8–49; **Met. instrument platform, Prague Astron. Obs.** (Seydl), 8.8–133.

8.8–58 551.5:355.353(73)(09)

Bates, Charles C., **Marine meteorology at the U. S. Navy Hydrographic Office: a resumé of the past 125 years and the outlook for the future.** *American Meteorological Society, Bulletin*, 37(10):519–527, Dec. **1956.** 2 figs., 2 tables, 11 refs. p. 523, **U. S. Navy Hydrographic Office meteorological publications of general interest.** p. 524, . . . **oceanographic publications of meteorological interest. DWB**—The history and development of marine meteorology (particularly pilot charts) is intimately tied up with the history and development of the U. S. Navy Hydrographic Office since the days of MAURY, superintendent from 1842 to 1861. In this informative article, quotations from official directive affecting the meteorological work of the Hydrographic Office from 1842 to 1955 are interspersed with comments on personal and administrative as well as scientific problems and lists of publications in the field of meteorology and oceanography. Relations with the U. S. Signal Corps (1870–1890) and the U. S. Weather Bureau, since 1890, are revealed by the see-sawing responsibility in early years and the close cooperation in recent years. *Subject Headings:* **1. History of the U. S. Navy Hydrographic Office 2. History of marine meteorology 3. Marine meteorological charts.**—*M.R.*

8.8–59 551.5:06(09)

Gregory, P., **Een eeuw Meteorological Office.** [A century of the British Meteorological Office.] *Hemel en Dampkring*, The Hague, 53(7):141–142, July **1955. DWB, DLC**—In the discussion of the activities of the British Meteorological Office the author reviews briefly the expansion of its activities since 1861. Special attention is called to the electronic calculations, the special weather reconnaissance flights, the use of radiosonde and radar, and forecasting of thunderstorms. *Subject Headings:* **1. History of British Meteorological Office 2. Airplane weather reconnaissance 3. Thunderstorm forecasting 4. Great Britain.**—*I.L.D.*

8.8–60 551.509(09)(44)

Sanson, J., **La prévision scientifique du temps à cent ans d'existence.** [Scientific weather forecasting in existence for 100 years.] *La Météorologie*, Paris, No. 38:167–172, April/June **1955.** Italian summary in *Rivista di Meteorologia Aeronautica*, 16(2):61–62, April/June **1956. DWB**—This note on early meteorology in France includes accounts of military disasters due to weather. The first storm warning service was established in France in 1855 and publication of daily weather charts was initiated in the same year. *Subject Headings:* **1. History of weather forecasting 2. French weather service.**—*G.T.*

EDUCATION

8.8–61 551.5:374.8

Booth, R. E., **Meteorological course at Malham Tarn, Yorkshire, 22–29 August 1956.** *Weather*, 12(4):125–127, April **1957.** 2 photos., 3 tables. **DWB**—Site and instrumental set-up and readings for 5 days tabulated. Less rain was always collected at the higher of two sites, probably because of updraft. *Subject Headings:* **1. Meteorological courses 2. Malham Tarn, Eng.**—*C.E.P.B.*

8.8–62 551.5:378

Meteorology at Saint Louis University. *American Meteorological Society, Bulletin*, 36(7):358–359, Sept. **1955.** 2 photos. **DWB, DLC**—A brief account of the history of the Observatory and the teaching of meteorology at St. Louis University since 1935, of the organization of the Geophysics Department and of the meteorology curriculum. *Subject Headings:* **1. Meteorological education 2. Teaching of meteorology 3. St. Louis Univ.**—*I.L.D.*

BIOGRAPHY

See also: **Progress in met.** (Neis), 8.8–17.

8.8–63 551.5:92

Hawke, E. L., **Editorial [on Alexander Buchan].** *Weather*, 12(5):138–139, May **1957. DWB**—Note on life of Alexander Buchan, Scottish meteorologist who died May 13, 1907, aged 78. Became Secretary of Scottish Meteorological Society in 1860. Worked up "Challenger" results. From 1883–1904 concentrated on maintaining Ben Nevis and Fort William observatories. *Subject Headings:* **1. Biography 2. Buchan, A.**—*C.E.P.B.*

8.8–64 551.5:92:52

Armitage, Angus and Ronan, Colin A., **Edmond Halley 1656–1742. Papers to commemorate the tercentenary of his birth.** *British Astronomical Association, Memoirs*, 37(3), Nov. **1956.** 39 p. 2 figs., portrait.—Armitage describes "Halley's astronomical heritage." Ronan, "Edmond Halley—the man and his work" is biographical; this and "The effect of Halley's astronomical work on later astronomy" also deals with his astronomical and geomagnetic work and briefly with his meteorological work. *Subject Headings:* **1. Biography 2. Halley, E.**—*C.E.P.B.*

8.8–65 92:91:012

†Schindler, Hans-Georg, **Die Schriften Otto Quelles (chronologisch geordnet).** [The writings of Otto Quelle arranged chronologically.] *Die Erde*, 3/4:369–376, **1954.** photo and address p. 217–218. **DLC**—On the occasion of O. Quelle's 75th birthday. His main interest was the geography of Iberian America and he founded the "Ibero-Amerikanisches Archiv," but his list of 187 works includes several on rainfall and the drought problem. *Subject Headings:* **1. Biography. I. Quelle, Otto.**—*C.E.P.B.*

8.8–66 92

†Olczak, Tadeusz, **Professor Edward Stenz, 1897–1956 [Obituary].** *Acta Geophysica Polonica*, Warsaw, 4(4):203–205, **1956.** Also: Olpińska-Warzechowa, K., **List of scientific papers of Professor E. Stenz. . . .** *Ibid.*, p. 205–214. 238 titles. **DWB, DLC**—Died Feb. 21, 1956 in Stockholm after 1½ years' illness. Director of Dept. of Geophysics at Warsaw University and editor of this journal. He worked in actinometry (1922–50), climatology, limnology, geothermy, geomagnetism, etc. and wrote in all 250 papers, books, texts and numerous popular articles since 1919. He organized a mountain observatory in the Tatra Mountains, participated in Polish expeditions to Swedish Lapland (1927), Siberia (1936), and the Caucasus (1954), and spent 1939–47 as director of the Meteorological Service in Afghanistan and organizer of the Department of Geophysics at Warsaw University. *Subject Headings:* **1. Obituaries 2. Bibliography of Edward Stenz. I. Stenz, Edward.**—*M.R.*

8.8–67 551.5:92

Von Engel, A., **Sir John Townsend, F.R.S.** *Nature*, London, 179(4563):757–758, April 13, **1957. DWB**—John Sealy Edward Townsend, born Queen's College, Galway, Ireland, June 7, 1868, died Oxford Feb. 16, 1957. Educated Trinity College, Dublin. Worked on formation of electrically charged clouds, from which he found ionic charge on a droplet is about 3×10^{-10} e.s.u. Also worked on solar disturbances, motion of swarms of electrons in gases, etc. *Subject Headings:* **1. Obituaries 2. Townsend, J. S. E.**—*C.E.P.B.*

8.8–68 551.574.41:92

Green, J. H. S., [**Biographical sketch of**] **William Charles Wells, F.R.S. (1757–1817).** *Nature*, London, 179(4568):997–999, May 18, **1957.** 6 refs. **DWB**—Born May 24, 1757, at Charleston, S. C. Studied botany and medicine, but known to meteorologists for his work, **On dew** (1814). Died in London, Sept. 18, 1817. *Subject Headings:* **1. Biography 2. Wells, William Charles.**—*C.E.P.B.*

BIBLIOGRAPHY—TERMINOLOGY

See also: **Snow bibliographies,** 8.8–2; **Ionosphere bibliographies,** 8.8–5; **Climate near the ground** (Geiger), 8.8–14; **Urban climate bibliography** (Kratzer), 8.8–15; **Bibliog. of Otto Quelle** (Schindler), 8.8–65; **Bibliog. of Edward Stenz** (Olczak), 8.8–66; **Guided missiles bibliog.** (U. S. Dept. of Army Library), 8.8–81; **Microwave spectroscopy bibliog.** (Duke Univ.), 8.8–183.

8.8–69 551.524.3:581.055:016:63

†Gloyne, R. W., **Notes, with annotated bibliography, on "Accumulated temperature" and certain related concepts.** *Great Britain. Meteorological Office, Agricultural Branch Memorandum*, No. 9, **1956.** 9 p. 35 refs. Mimeo. **GB-MO**—The concept of accumulated mean air temperature above 6°C or 42°F in plant growth is traced since 1837 and its limitations noted. The bibliography follows (p. 4–9). *Subject Headings:* **1. Accumulated temperature 2. Agricultural climatology 3. Bibliography of accumulated temperature.**—*C.E.P.B.*

8.8–70 551.510.535:016

†Manning, Laurence A., **Survey of the literature of the ionosphere.** Stanford Univ. Radio Propagation Laboratory, Contract AF 19(604)–686, Final Report, July 31, **1955.** 650 p. illus., tables, eqs. About 1400 abstracts arranged alphabetically by author. *ASTIA photostat*, No. AD-75-477. "In essence a second edition of the **Survey** of 1947 which was prepared for the Air Materiel Command" (*see* 4F–35, June 1953, *MAB*).—The 1000 abstracts in the 1947 edition have been increased to over 1400, and the annotated bibliography (p. 19–463) is supplemented by lists of journals, subjects and institutions and their code abbreviations, a subject index (p. 464–511), and a summary of knowledge of various aspects of ionospheric physics and propagation (p. 512–650). The subjects discussed are: structure, recombination, disturbances, propagation, methods of investigation, wave paths, height analysis and meteors. The latest abstracts included are 1954, the earliest about 1928. *Subject Headings:* **1. Ionosphere bibliographies 2. Ionospheric propagation.**—*M.R.*

8.8–71 551.5(048)

Rigby, Malcolm, **More about meteorological books, 1954–56.** *Weatherwise*, Boston, 9(3):98–101, June **1956. DWB**—Seventeen U. S. and British meteorology books of 1954–56 are reviewed under several headings: micrometeorology and plant climate, weather control, popular books, etc. *Subject Heading:* **1. Meteorological book reviews.**—*M.R.*

8.8–72 551.579(03)

[**Asian glossary of hydrologic terms.**] *Science*, Washington, D. C., 122(3174):827, Oct. 28, **1955. DLC**—A 130 page glossary of 1000 terms used in hydrology was prepared by nine hydrologists from four Asian countries and various international agencies. Experts met at Bangkok from Sept. 12–26, 1955 under WMO and ECAFE. The **Asian Glossary of Hydrologic Terms** is in English and scheduled to be published early in 1956 as part of ECAFE's flood control series. *Subject Heading:* **1. Hydrologic glossaries.**—*M.R.*

PRACTICAL AND APPLIED METEOROLOGY

OCEANOGRAPHY AND MARINE METEOROLOGY

See also: **Marine met.** 8.8–8; **Lightship obs. data, North Sea** (Netherlands. Met. Inst.), 8.8–24; **Climatic data of Netherlands lightships** (Verploegh), 8.8–25; **Sea surface temp., N. Atlantic, 1887–1936** (Riehl), 8.8–26; **Oceanog. and met. data, Mediterranean** (Netherlands. Met. Inst.), 8.8–34; **Ger. contribution to IGY oceanog. res.** (Dietrich), 8.8–36; **Hist. of Marine met.** (Bates), 8.8–58; **Generation of edge waves** (Greenspan), 8.8–205; **Early ice winter, Gulf of Bothnia,** 8.8–230; **Foam layer of sea water** (Abe), 8.8–253; **Wind driven currents, Pacific** (Shtokman), 8.8–254; **Wind-wave energy transfer** (Walden), 8.8–255.

8.8–73 551.582.3(261)

*Bullig, H. J. and Bintig, P. (*eds.*), **Klimatologie der nordwesteuropäischen Gewässer, Teil 1, Temperatur des Oberflächenwassers und Temperatur-Differenz Luft-Wasser.** [Climatology of northwest European waters, Pt. 1, Temperature of surface waters and temperature difference air-water.] *Hamburg. Seewetteramt, Einzelveroffentlichungen,* No. 4:1–25, **1954.** Also: Makrgraf, H. and Bintig, P., **Pt. 2, Windverhältnisse.** [Wind conditions.] *Ibid.,* p. 27–59. almost entirely charts. **DWB.** Also: Markgraf, H. and Bintig, P. (*eds.*), **Pt. 3, Lufttemperatur, Bewölkung, Niederschlag, Nebel.** [Air temperature, cloudiness, precipitation, fog.] *Ibid.,* No. 10:61–102, **1956.** numerous tables and charts. **DWB.** Review by H. Walden in *Petermanns Geographische Mitteilungen,* 101(2):124, **1957. DLC**—Pt. 1 of this marine meteorological atlas for the North Sea, Baltic and northern parts of the N. Atlantic (40°–75°N) consists of monthly or seasonal and annual charts showing for 1° squares of lat. and long. the mean temperature of the sea surface and the temperature differences between the air and sea surface. The extreme high and low temperature, variation from month to month and within a month, comparison between mean for 1922–39 and 1906–13, etc. The data, based on over $1\frac{1}{2}$ million punch cards for 1906–1914, 1920–29 and for >60°N (1945–51) are entered for each 1° square in most cases, and isarithms drawn wherever feasible. Pt. II gives similar monthly charts of wind speed, wind roses, prevailing direction, mean wind components (zonal and meridional), mean wind vectors, constancy of wind, etc., and many histograms or graphs showing annual range of wind parameters. Pt. III gives charts of mean monthly sea surface temperature for nighttime observations only (20–04 h local time), thermal wind roses, cloudiness, cloudiness wind roses, precipitation frequency, precipitation frequency by wind direction, fog frequency, fog frequency in the North and Baltic Seas, and tables of basic data as used on the charts. In each case where significant, the number of observations per 1° square are given. The charts and diagrams are excellently prepared and well annotated. Where graphs are prepared, the areas for which data are selected are shown on inset charts. Except in summer months there are not much data for waters N of 65°N. *Subject Headings:* **1. Marine climatic atlases 2. Climatic charts for N.E. Atlantic 3. Climatic data for N.E. Atlantic 4. N.E. Atlantic 5. North Sea 6. Baltic Sea.**—*M.R.*

8.8–74 551.524.4:551.501.2(26)

Brocks, Karl, **Atmosphärische Temperaturschichtung und Austauschprobleme über dem Meer.** [Atmospheric temperature stratification and the Austausch problem over the sea.] *Germany. Deutscher Wetterdienst, Berichte,* 4(22):10–15, **1956.** 3 figs., 2 tables, 8 refs., 16 eqs. **DWB, DLC**—An analysis of the effects of vertical density stratification upon the austausch mechanism, in particular the so-called convection that arises during marked superadiabatic temperature stratification. The author analyzes the temperature and vapor pressure fields of the labile lower layer of the atmosphere above the sea surface using vertical temperature gradients obtained by optical gradient measurements and developing equations for expressing temperature stratification as a function of temperature difference of air minus water; water temperature and vertical water vapor distribution as a function of temperature gradient and wind velocity; and the characteristics and determination of the stratification coefficient. Observations of wind velocity over the sea published by H. U. Roll (*see* 6.8–68, Aug. 1955, *MAB*) and J. S. Hay (*R.M.S., Q. J.,* 81:307–319, 1955, (*see* 6.11–252, Nov. 1955, *MAB*), from which wind velocity can be calculated, are used to compare with values of water vapor

stratification calculated by the author (*see* 7.2–202, Feb. 1956, *MAB*). *Subject Headings:* 1. **Temperature stratification** 2. **Austausch** 3. **Water vapor stratification.**—*I.L.D.*

8.8–75 551.515:551.461.2

Ewing, Maurice, **Explanation of the Lake Michigan wave of June 26, 1954.** *Science*, Wash., D. C., 120(3122):684–686, Oct. **1954.** 2 figs., table, 5 refs. Also: Donn, William L. and Ewing, Maurice, **Stokes' edge waves in Lake Michigan.** *Ibid.*, 124(3234):1238–1242, Dec. 21, **1956.** 9 figs., 2 tables, 10 refs., 11 eqs. **DLC**—In the first article the author described conditions during the storm surge of June 26, 1954 which took several lives on Lake Michigan at the Chicago waterfront. The surge is explained as "resonant coupling between a fast moving pressure jump line and the resulting gravity wave generated in the lake," the two hour delay in arrival at Chicago being due to reflection of the wave from the east shore. The second article gives a detailed description and explanation of another surge that occurred 10 days later (July 6–7, 1954), but which was a different type of phenomenon. It is shown that the later surge was caused by edge waves generated by a fast moving (50 mph) squall line that came down the lake from the north, rather than crossing the lake. The barometric disturbance continued for 9 hrs or more after the original pressure jump, and the wave disturbance continued for 29 hrs. Wave records made at a number of places on both shores of Lake Michigan and barograph records for Chicago and Muskegon are reproduced and analyzed. *Subject Headings:* 1. **Storm surges** 2. **Stokes' edge waves** 3. **Lake Michigan.** —*M.R.*

8.8–76 551.46:629.12

Deacon, G. E. R. (*Natl. Inst. of Oceanog., Wormley, Eng.*), **Applications of oceanography to navigation.** *Journal of Marine Research*, New Haven, Conn., 14(4):333–336, **1955. DWB, DLC.** Also in *National Institute of Oceanography, Wormley, Surrey, England, Collected Reprints*, 4(125), Dec. **1956. DWB**—The author outlines the needed knowledge of the ocean phenomena that is important in navigation. This covers tidal information for places where tidal records are lacking, knowledge of tidal streams, some satisfactory knowledge of wind drifts, information on ordinary waves and swell and on the various types of long waves, etc. *Subject Headings:* 1. **Oceanographic studies** 2. **Ocean waves** 3. **Navigation.**—*I.L.D.*

8.8–77 551.46

Defant, A., **Aufgaben und Ergebnisse der modernen Meeresforschung.** [Exercises and results of modern oceanography.] *Naturwissenschaften*, 44(7):214–225, April 1, **1957.** 22 figs. **DWB**—Address to Society of German Naturalists and Doctors, Sept. 26, 1956. Underwater topography is described as revealed by echo soundings of "Meteor," American Ice Patrol, "Gauss" and "Anton Dohrn." The average surface currents of the Atlantic have been deduced from daily observations of thousands of merchant ships, meanderings of Gulf Stream from synoptic observations. Dynamics of ocean currents are discussed, and broad agreement of theory with observation shown (but not the strong currents of the west margins). Three-dimensional structure is then described, including spread of Antarctic bottom water, convergences and fronts. Finally, tides and wave propagation are dealt with. *Subject Heading:* 1. **Oceanography.**—*C.E.P.B.*

8.8–78 551.515.1:551.461.2(261.2)

Weenink, M. P. H., **The "twin" storm surges during December 21–24, 1954: a case of resonance.** *Deutsche Hydrographische Zeitschrift*, 9(5):240–249, **1956.** 9 figs., ref., 21 eqs. English, German and French summaries p. 240. **DWB**—The actual sea level disturbances at Hoek van Holland during the two storms of 21st–24th Dec., 1954 are compared to disturbance heights that are computed on the assumption that the sea level disturbances at any place behave like the deviations of a damped harmonic oscillator from its equilibrium position. From this comparison the parameters of the model and, hence, the eigen-period and the resonance period of oscillation have been computed. Moreover, it is shown that in the present case, we can speak of resonance and, finally, that an assumed third storm of the same force and occurring after the same time interval would have given about the same maximum disturbance height. *Subject Headings:* 1. **Storm surges** 2. **North Sea.**—*Author's abstract.*

8.8–79 551.311.181(261.3)

Palosuo, Erkki, **Über verschiedene Vereisungtypen im Finnischen Meerbusen.** [On different types of ice formation in the Gulf of Finland.] *Deutsche Hydrographische Zeitschrift*, 9(5):222–225, **1956.** 3 figs., table, 2 refs. German, English and French summaries p. 222. **DWB**—Ice formation begins with a cold wave, usually from N.E. If the wind drops an ice skin forms rapidly, even simultaneously over the whole area (static ice formation). If the wind continues, ice forms along the northern shore and drifts away, leaving an open lane in which new ice forms, and so on until it covers the whole Gulf, advancing westwards at 1–2 kn (dynamic ice formation; example Feb. 1–13, 1953). The accumulated negative temperature needed for dynamic ice formation is generally greater than for static. The effect of the wind in clearing away ice increases with wind strength, especially in open water. *Subject Headings:* **1. Sea ice formation 2. Gulf of Finland.**—*C.E.P.B.*

ASTRONAUTICS—SATELLITE OBSERVATORIES

See also: **Advances in Geophysics** (Landsberg), 8.8–1.

8.8–80 613.693:629.19

Balakhovskiĭ, I. S. and Malkin, V. B., **Biologicheskie problemy mezhplanetnykh poletov.** *Priroda*, Moscow, No. 8:15–21, Aug. **1956.** 2 figs. **DLC.** German version as **Biologische Probleme des Raumflugs.** [Biological problems of space flight.] *Naturwissenschaftliche Rundschau*, 10(5):173-177, May **1957. DWB**—Problems considered are influence of acceleration on man, absence of gravity, cosmic radiation and meteorites. Cosmic rays are the greatest danger and may derange functioning of whole organism. Oxygen pressure must be at least 100 mm, or 200 mm if mixed with CO_2 and water vapor. Problems of setting foot on strange planets are also discussed. There are many unsolved problems in interplanetary flight. *Subject Heading:* **1. Space medicine.**—*C.E.P.B.*

8.8–81 551.507.36:629.19:016 551.507.362:016

†U. S. Dept. of the Army. Army Library, **Guided missiles, rockets and artificial satellites (including Project Vanguard): a selected list of titles.** Its *Special Bibliography*, No. 11, Jan. 23, **1957.** 153 p. "Current companion volume to its *Special Bibliography*, No. 4 (Guided Missiles), April 20, 1956." **DWB**—Briefly- or non-annotated reference material is arranged in alphabetical order by title within major and subject groups, under Sec. VI. Missiles and Rockets (by type). Pt. E (Experimental and Specialized Vehicles) contains references to Aerobee Rockets (p. 48), ASP (Atmospheric Sounding Projectile) (p. 48), Viking (p. 52). Artificial Satellites are covered in Pt. II (IGY program, p. 130; Project Vanguard, p. 131; other satellite projects, p. 145). Scientific applications of satellites are covered on p. 151. At least 50 papers or books of interest to meteorologists will be found in this section. No author or subject index is provided. *Subject Headings:* **1. Satellite bibliographies 2. Rocket bibliographies.**—*M.R.*

AERONAUTICAL METEOROLOGY

See also: **Meteorology for fliers** (Dannevig), 8.8–12; **Jet stream** (Roche), 8.8–204; **Pressure pattern flying** (Warntz), 8.8–236; **Icing of aircraft** (Jones), 8.8–265.

8.8–82 551.557:629.13(02)

U. S. Air Weather Service, **4-D analysis and forecasting procedures for optimum flight planning.** Its *AWS Manual* 105-49, Jan. **1956.** 51 p. 15 figs., 14 refs., eqs. **DWB**—A concise, though detailed, manual covering preparation of 4-D (space and time) charts, presentation of forecasts for optimum flight paths, flight planning, flight watch and actual examples. The necessary nomograms, tables, sample synoptic charts and determinations (time fronts, minimal headings, and single headings) presented graphically are included along with a pastagram. *Subject Headings:* **1. Optimum flight planning manuals 2. Pastagrams 3. Aeronautical meteorology.**—*M.R.*

8.8–83 551.576.4:629.13(54)

Ramamurthi, K. M. (*Met. Office, New Delhi*), **Summary of the debriefing reports from "Comets."** *Indian Journal of Meteorology and Geophysics*, New Delhi, 6(3):243–250, July **1955.** 2 tables, 5 refs. **DLC**—Tables showing the frequencies of heights of tops of cumuliform clouds and height of bases and tops of high and medium clouds over Colombo-Bombay route and the Delhi-Calcutta routes and details regarding turbulence reported during the period May 1952–Dec. 1953 are presented and the various cloud, icing and turbulence conditions are summarized. *Subject Headings:* **1. Cloud heights 2. Atmospheric turbulence 3. Delhi-Calcutta air route 4. Colombo-Bombay air route 5. India.**—*I.L.D.*

8.8–84 551.551.5:551.506.7:629.13

Sugimoto, Y., **Effect of turbulence on aircraft operation.** *Journal of Meteorological Research*, Tokyo, 8(2):55–68, March **1956.** 18 figs., 11 tables, eqs. In Japanese; English summary p. 55. **DWB, DLC**—A study is made of the turbulence which affected aircraft operation in a period of seven months from May 1955 to Nov. 1955 on three routes, namely those from Tokyo to Wake Island, Hongkong and Manila. From reports of 517 flights on those routes within the said period, the author has obtained the distributions of occurrence and intensity of turbulence, and the relations between pressure pattern and turbulence encountered by aircraft. In the last part of the paper the author gives an example of clear air turbulence and a formula expressing the relation between turbulence and the Richardson number. The minimum value of the Richardson number for the most turbulent area is calculated to be 3.5. *Subject Headings:* **1. Upper air turbulence 2. Aircraft operation.**—*Author's abstract.*

GLACIOLOGY

See: **Glaciological res., Antarctica** (Shumskiy), 8.8–48.

GEOMAGNETISM

See: **Magnetic observatories** (Finch), 8.8–49; **Geomag. fluctuations** (Dagg), 8.8–189; **Geomag. micropulsations** (Kato, Akasofu), 8.8–228; **Solar neutrons and magnetic storms** (Petukhov), 8.8–311.

AGRICULTURAL METEOROLOGY

See also: **Agric. implications of weather control** (Pavelis), 8.8–21; **Agroclimate of Lower Rhine** (Weischet), 8.8–23; **Agroclimatology** (Gloyne), 8.8–69; **Frost warning serv., W. Germany** (Wegelben), 8.8–174; **Fruit frost forecasting, Fla.** (Johnson, Russell), 8.8–176; **Effect of drought on wheat crop** (McQuigg), 8.8–273; **Ecological crop geog., Ryukyu Is.** (Nuttonson), 8.8–298.

8.8–85 551.584.61:631.2 551.506:637.12

Ádám, Tamás and Batta, Erzsébet, **Az időjárás hatása a tejtermelésre.** [Weather effects on milk production.] *Időjárás*, Budapest, 60(3):168–176, May/June **1956.** 4 figs., 2 tables, 6 refs. Russian and German summaries p. 168. **DLC**—An experiment was made with ten cows from March 9 to April 16, 1955 at Taksony, Hungary. The purpose of the study was to determine (a) relations between ambient weather and barn climate and (b) effects of temperature, humidity, evaporation, precipitation, pressure, wind, frontal passages and air masses upon the quantity and fat content of milk produced. Relations between these factors are shown in tables and graphs. The strongest correlation was found between precipitation and milk production. A strong positive correlation also exists between evaporation and fat content of milk. Frontal passages and air masses also showed a definite influence on milk production. It is suggested that these connections should be analyzed statistically. *Subject Headings:* **1. Barn climates 2. Weather effects on milk production.**—*G.T.*

8.8–86 551.582:633.61(46, 763)

Blume, Helmut, **Zuckerrohranbau in Andalusien verglichen mit dem Rohranbau in Louisiana.** [Sugar cane cultivation in Andalusia compared with Louisiana.] *Die Erde*,

88(1):10–38, **1957.** 8 figs., table, 37 refs. English summary p. 10. **DLC**—The cultivation of sugar cane in the flood plains of the Andalusian coast and the Mississippi delta is described. Climates are compared; temperature and rainfall of Malaga and Reserve (La.) and rainfall and potential evaporation of Malaga and Almeria are plotted. On Spanish coast culture of sugar cane is limited eastwards by drought, especially in summer, and irrigation is necessary. Temperature is also a limiting factor; Louisiana has greater extremes. Other parts of Spain where sugar was formerly cultivated have lower winter minima than Malaga. *Subject Headings:* **1. Local climate 2. Sugar cane cultivation 3. Andalusia, Spain 4. Louisiana, U. S.**—*C.E.P.B.*

8.8–87 551.311:631.4:551.1

Dylik, Jan, **Problematyka geomorfologiczna wobec potrzeb rolnictwa.** [Geomorphological problems as related to agricultural needs.] *Przegląd Geograficzny*, Warsaw, 26(4):4–36, **1954.** 6 figs., 48 refs. Russian and English summaries, p. 22–36. **DWB, DLC**—Studies of geomorphological mapping and of particular problems of periglacial relief of present day Poland. Slope processes are not simple. For instance, it was found that a gentle slope was more subject to slope erosion than a steep one, because the freezing and thawing effect was greater in the gentle slope. Photographs show examples of erosion due to thawing (on grain fields) and due to other processes. *Subject Headings:* **1. Geomorphology 2. Slope erosion 3. Solifluction 4. Soil erosion 5. Poland.**—*M.R.*

8.8–88 551.509.532:633.11

Lichikaki, V. M., **Metodika prognoza kriticheskoĭ temperatury ozimoĭ pshenitsy.** [Method of forecasting the critical temperature of winter wheat.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:38–40, Nov./Dec. **1955.** 3 figs., table, eqs. **DWB, DLC**—Experimental data on the relationship between the frost resistance of winter wheat varieties are presented and the dependence of frost resistance upon the sum of mean daily temperature of the atmosphere and of the soil at the depth of the branching node is expressed by means of graphs in which the sums of the daily means of temperature from the date on which resistance passes through 0°C to the date of the experimental determination of the critical temperature are represented on the abscissa and the critical temperature are represented on the ordinate. These relationships are expressed also by means of empirical formulas. On the basis of both graphs and formulas a table is constructed giving the scale of dependence of the critical temperature of winter wheat upon temperature and soil temperature at the branching node. The reliability of these forecasting procedures examined by means of specific examples was found to be very high. *Subject Headings:* **1. Frost resistant wheat 2. Frost forecasting formulas 3. Wheat.**—*I.L.D.*

8.8–89 551.509.5:632.9:633.491

Smith, L. P., **Potato blight forecasting by 90 per cent humidity criteria.** *Plant Pathology*, Harpenden, 5(3):83–87, Sept. **1956.** 2 figs., 2 tables, 3 refs. Abstracted from reprint. **DA**—Potato blight warnings by Beaumont criteria from individual stations were not valid for zones in 43 out of 220 forecasts, due to apparent breakdown of humidity criterion. New criteria are suggested—minimum temperature $\geq 50°F$, humidity $\geq 90\%$ for at least 11 hrs on 2 consecutive days. Results are compared with observations. Local differences in numbers of days with more than 12, 15 and 18 hrs of relative humidity $\geq 90\%$ are tabulated. *Subject Heading:* **1. Potato blight forecasting.**—*C.E.P.B.*

8.8–90 551.526:633.18

Tanaka, Minoru (*Aomori Agri. Exp. Station*), **Effects of water temperature in the paddy field to the yield of rice plants (Practical studies on the injuries of cool weather in rice plants, Pt. 7).** *Journal of Agricultural Meteorology*, 9(2):41–44, March **1954.** In Japanese, English summary p. 44. 4 figs., 7 tables. **DWB**—The relationship between rice yield and water temperature of a paddy field was studied during good and poor harvest years. It was found that field water temperature influences paddy yield. The growth stage most subject to damage by low water temperature is between the fortieth and fiftieth day preceding the date

of heading. *Subject Headings:* **1. Low water temperature effects on rice paddies 2. Rice yield 3. Water temperatures.**—*Based on author's summary.*

8.8–91 551.577.2:551.577.38:58(764)

Thomas, Gerald W. and Young, Vernon, **Relation of soils, rainfall and grazing management to vegetation—Western Edwards Plateau of Texas.** *Texas. Agricultural Experiment Station, College Station, Bulletin,* No. 786, Nov. **1954.** 22 p. 22 figs., 3 tables, 23 refs. **DWB**—Distribution of rainfall by months and by years at Texas Range Station in Crockett County, is shown on two histogram charts. Record runs from 1938–1953 [varies from 6.6″ (1951) to 46.2″ (1941) and is extremely variable from month to month with wet summers and dry winters]. Soil temperature at 3 and 6″ depth is shown graphically for bare ground, tobosa soil and buffalo and curly mesquite cover. Effects of rainfall and drought on vegetation are discussed on p. 12–16 and shown in numerous graphs. A lag of about 1 yr is shown in correlation between rainfall and density of grass. *Subject Headings:* **1. Drought effects on pastures 2. Rainfall distribution 3. Soil temperatures 4. Climate of Crockett County, Tex. 5. Crockett County, Tex.**—*M.R.*

FOREST METEOROLOGY

See: **Climate near the ground** (Geiger), 8.8–14.

INDUSTRIAL AND MEDICAL METEOROLOGY

See also: **Weather and petroleum industry,** 8.8–3; **Air conditioning and heating symposia,** 8.8–4; **Met. off. assistance to heating and ventilating engineers** (Veryard), 8.8–52; **Oceanog. applied to navigation** (Deacon), 8.8–76; **Space medicine** (Balakhovskiĭ, Malkin), 8.8–80; **Sky radiation in building design** (Dirmhirn), 8.8–218.

8.8–92 551.510.42:628.53

Davidson, W., **Domestic smoke reduction.** *Smokeless Air,* 92:107–108, 110, Winter **1954.** fig., table. **DWB**—Discussion of possibility of reducing domestic smoke emission by up to 80% compared with pre-war coal fire by modern heating stoves, especially Parkray No. 2. *Subject Heading:* **1. Smoke abatement.**—*C.E.P.B.*

8.8–93 551.510.42:628.53:614(09)

Wormsley, B. H., **Sanitary reform and smoke abatement.** *Smokeless Air,* 92:83–87, Winter **1954.** 2 photos. **DWB**—History of sanitary reform in 19th Century is summarized and parallels to smoke abatement drawn. An Institute devoted to atmospheric pollution problems is suggested. *Subject Headings:* **1. Smoke abatement 2. Public health.**—*C.E.P.B.*

8.8–94 551.586:612.2

Faust, H., **Experimentelles zur Wetterempfindlichkeit.** [Experiments on weather sensitivity.] *Naturwissenschaftliche Rundschau,* 10(5):189, May **1957. DWB**—Recently the autonomic nervous system has been replaced by physical-chemical processes in body cells as the connecting link between weather and the human organism. R. Neuwirth investigated influence of atmospheric processes on cell colloids; he found relations between colloids in sealed containers and passage of cold fronts, vertical decrease of temperature and height of 500 mb surface. *Subject Headings:* **1. Weather sensitivity. I. Neuwirth, R.**—*C.E.P.B.*

8.8–95 551.510.42:628.51

Die Verunteinigung der Luft, I. Wirkung auf Tiere, Menschen und Pflanzen. [Atmospheric pollution, Pt. 1, Effect on animals, men and plants.] *Umschau,* 57(10):298–300, May 15, **1957.** fig., 3 tables. **DLC**—Industrial pollution is by gases and smoke. Effect of different exposures of frogs, mice, rabbits, cats and dogs and men to different concentrations of SO_2 are tabulated. In towns concentration is usually one or two orders of magnitude below the danger level but continuous exposure, e.g., in work places, may have unexplained effects. Maximum harmless concentrations of other gases, breathed for 8 hrs, are tabulated.

Plants are more susceptible than animals to SO_2 but effects differ according to plant and season. Damage by smoke and dust is briefly considered. *Subject Heading:* **1. Atmospheric pollution**—*C.E.P.B.*

RADIOACTIVITY—ATOMIC EXPLOSIONS

See also: **Bulletin of Atmos. Radioactivity**, 8.8–7; **Weather determines blast prediction for atom tests** (Reed), 8.8–318.

8.8–96 551.594.1

*Blifford, Irving H., Jr. and Lockhart, Luther B., Jr., **Radioactivity of air and fallout samples collected on the 80th meridian.** *U. S. Naval Research Laboratory, NRL Memorandum Report*, 626, Aug. **1956.** 3 p. 8 tables. **DWB**—This brief report contains data for atmospheric radioactivity collection sites along the 80th meridian for May and June 1956 (Guayaquil, Panama, Lima and Wash., D. C.). A table shows dates when collections were started at these stations and at Santiago, Chile, and names of stations not yet in operation. Cloth screens for wind vanes, gummed paper and small filters are supplied to stations, samples are shipped to Washington and are counted on 14th day after collection. Tables give β data for 3 different methods of collection. *Subject Headings:* **1. Radioactive fallout networks 2. Radioactive fallout data.**—*M.R.*

8.8–97 551.578.7:551.594.14

Blifford, Irving H., Jr.; Patterson, R. L., Jr.; Lockhart, L. B., Jr. and Baus, R. A. (*all U. S. Naval Res. Lab., Wash., D. C.*), **On radioactive hailstones.** *American Meteorological Society, Bulletin*, 38(3):139–141, March **1957.** fig., table, ref. **DWB, DLC**—Measurements of the β activity of 11 hailstones collected in the Wash., D. C., area during a storm on May 26, 1953, (*see* 7E–93, May 1956, *MAB*) show an average value of 1.4×10^{-10} curie/ml. Analysis of concentric layers of 4 stones showed that the β activity of the cores was about 3 times as high as was that of the outside layer, indicating that the hailstones were probably formed in a region of relatively high concentration of fission products. *Subject Headings:* **1. Radioactivity of hailstones 2. Hailstorm, Washington, D. C. (May 26, 1953) 3. Washington, D. C.**—*M.R.*

8.8–98 662.2:539.1:536

Brickwedde, F. G. (*Natl. Bur. of Stand. and Univ. of Maryland*), **Temperatures in atomic explosions.** *American Institute of Physics, Temperature, its measurement and control in science and industry*, Vol. 2 (Oct. 1954 Symposium), pub. **1955.** p. 395–412. 8 figs. (incl. photos) 18 eqs. **DWB, DLC**—Temperatures in atomic explosions are much greater (2 to 10,000 times) than that in an equal TNT explosion, but the energy release is 20,000,000 times as great. The difference is accounted for as due to the high temperature thermal capacity of the nuclear core. About $\frac{1}{3}$ of the energy is released as thermal radiation; in a TNT explosion, little radiation is involved. Temperature, pressure, luminosity and other phenomena inside or associated with the fireball are discussed for various time intervals after the explosion (the shock wave advances ahead of the fireball after .015 sec, and the temperature and illumination which have been dropping rapidly, give way to a temporary rise in temperature and illumination when the hot isothermal sphere bounded by its radiation front reaches the outer surface of the fireball by a process of diffusion of photons). Then the temperature begins falling again. The incorporation of air, the speed of rise of the cloud, the absorption of radiation by the atmosphere keeping the effective temperature down, are discussed and illustrated graphically and with photos. *Subject Heading:* **1. Atomic explosion temperatures.**—*M.R.*

8.8–99 551.594.14

Campbell, Charles I., **Radiostrontium fallout from continuing nuclear tests.** *Science*, Wash., D. C., 124(3227):894, Nov. 2, **1956.** 5 refs., 2 eqs. **DLC**—The problem of stratospheric storage of Sr^{90} from thermonuclear tests must be resolved before the amount of accumulated Sr^{90} and hence the maximum amount of fallout and soil accumulation at any given time or over any period of years can be calculated. The formulas involved are generally agreed on, but a maximum accumulation of 80 mc/mi² yr is estimated by the author, compared with 1/10 that amount as estimated by LIBBY (1956), owing to the latter figuring results from

one test, and the author figuring on accumulated effects of continuous tests at the rate known to exist in the past few years. The only way to keep the concentration in soil down to a safe level would be to cut down tests, or to decrease input into stratosphere or to increase maximum permissible amount in bodies of people. *Subject Headings:* **1. Sr^{90} fallout 2. Stratospheric storage of Sr^{90} 3. Maximum permissible Sr^{90} accumulation. I. Libby, W. F.**—*M.R.*

8.8–100 551.594.14

*Eisenbud, M. and Harley, J. H., **Radioactive fallout through September 1955.** *Science*, Wash., D. C., 124(3215):251–255, Aug. 10, **1956.** 2 figs., 2 tables, 9 refs. **DLC.** Also: **Latest fallout report.** *Science News Letter*, Wash., D. C., 70(8):118, Aug. 25, **1956. DWB, DLC, DGL**—This report gives the results of fallout measurements made at 62 of the 88 stations outside the U. S. and 26 stations inside continental U. S. since Oct. 1951. Data given are for mixed fission products (shown on map of world) and Sr^{90} (Mc/mi^2) as well as gamma dose (mrad). This is the first report that has given the total gamma dosage (average 10 mrad compared with 300 mrad from natural sources and cosmic rays in the same time (1951–55). Highest accumulation was 740 mc at Grand Junction, Colo., and lowest was 33 mc at Lagos, Nigeria. The amount of Sr^{90} in milk in U. S. early in 1956 was about 3/1000 of what would be considered harmful. *Subject Headings:* **1. Radioactive fallout data 2. Radioactive fallout networks 3. United States.**—*M.R.*

8.8–101 551.509.58:551.594.14:681.14:35

Frenkiel, François N. (*Applied Physics Lab., Johns Hopkins Univ., Silver Spring, Md.*), **Radioactive pollution and civil defense.** *Washington Academy of Sciences, Journal*, 46(7):206–210, July **1956.** 4 refs. **DLC, DGL**—Usefulness of high speed computing techniques during periods when the synoptic forecaster indicates danger from high concentrations of pollutants is discussed and applied to the Los Angeles case and to the Wash., D. C., area for civil defense (against radioactive pollution) operations. The problems of defense against actual fallout is different from the problem of defense against a probable attack involving risk of moving the population into instead of out of a hazardous area. In any event rapid communications and data integration are essential so correct decisions can be made. A number of computing centers should be established throughout the country. *Subject Headings:* **1. Civilian defense 2. Radioactive pollution forecasting 3. Electronic computers for fallout forecasting.**—*M.R.*

8.8–102 551.510.42:623.454.8:551.578.11

Greenfield, S. M., **Rain scavenging of radioactive particulate matter from the atmosphere.** *Journal of Meteorology*, 14(2):115–125, April **1957.** 8 figs., 9 refs., 23 eqs. **DWB**—Langmuir's "collection efficiency" of a falling raindrop is modified to take account of density of radioactive particles and fraction scavenged out of a cylinder of diameter of largest drop. Graph shows percent of particles of given diameter scavenged from cloud as a function of rainfall rate and duration. Particles $<2\mu$ diameter are removed in only minute amounts, but some coagulate with cloud droplets which are subsequently collected by rain drops. Fractions picked up by droplets of 20μ diameter in turbulent clouds of liquid water content 0.4×10^{-6} gm/cm^3 are graphed. It is found that total fraction scavenged depends on depth of rainfall and not on intensity; fractions removed by rainfalls up to 20 mm are plotted. *Subject Headings:* **1. Atomic explosion products 2. Rain removal of radioactive products.**—*C.E.P.B.*

8.8–103 551.594.14:551.578.11

King, P.; Lockhart, L. B., Jr.; Baus, R. A. et al., **RaD, RaE, and Po in the atmosphere.** *Nucleonics*, N. Y., 14(6):78, 80–84, June **1956.** 4 tables. **DLC**—Rainwater and air filter collections made in 1950 at Wash., D. C., and at several U. S. Navy bases in various parts of the world show that RaD activity varies widely (by a factor of 10) between island sites (e.g., Samoa) and inland locations (Wash., D. C.), and also at different times at same place, though not as widely as between places. Data on Bi and Pb fractions (α and β activity) in air and rainwater at Washington, and 6 other places, and RaE (Bi^{210}) at Washington are presented in detail. Methods of collection and chemical analysis are described in full. *Subject Headings:* **1. Radioactivity of rainwater 2. Radioactivity of the atmosphere 3. Washington, D. C. I. Patterson, R. L., Jr. II. Friedman, H. III. Blifford, I. H., Jr.**—*M.R.*

8.8–104 551.594.14:623.454.8

†Kulp, J. Laurence; Giletti, Bruno J. and Broecker, Wallace S., **Radioactive isotopes in the atmosphere.** Columbia Univ. Lamont Geological Observatory, Contract AF 19(604)-851 Final Report, July 15, 1956. 41 p. numerous figs. and tables, 83 refs., 20 eqs., appends.—This report constitutes a summary of all the research carried out under this contract. The contents are as follows: history and objective of the project which initially was the development of a technique for measuring small concentrations of radioactive isotopes introduced into the atmosphere by atomic explosions especially C^{14} and H^3; tritium distribution in natural water natural and bomb produced variations of tritium in rainfall; survey of published methods for counting low level activities of C^{14} and tritium; carbon monoxide in the earth's atmosphere; carbon^{14} scintillation counting; H_2 extraction from air; the natural tritium content of atmospheric hydrogen; atmospheric sampling of CO_2 for C^{14} assay; low level C^{14} counting system using CO_2; quantitative preparations of H_2 from H_2O; radiometric assay of H^3 by proportional counting of hydrogen-methane mixtures; electrolytic enrichment procedure; H/D analysis in modified consolidated 401 mass spectrometer; and catalogue of natural water samples collected in connection with this work. *Subject Headings:* **1. Radioactivity in the atmosphere 2. Atomic explosions 3. Radiocarbon concentration 4. Tritium measurement.** —*I.L.D.*

8.8–105 551.510.42:623.454.8:551.557.2

Machta, L.; Hamilton, H. L., Jr.; Hubert, L. F.; List, R. J. and Nagler, K. M., **Airborne measurements of atomic debris.** *Journal of Meteorology*, 14(2):165–175, April **1957.** 50 figs., 2 tables, 2 refs. **DWB**—Relative measurements were made in flights along 80th and 95th meridians after 5 tests of atomic devices in Nevada (Jan. 27–Feb. 6, 1951). Numerous radioactivity profiles are shown. Air trajectories at levels 10,000–40,000 ft were drawn from meteorological data for each burst and errors where trajectory crosses flight line are tabulated. Coefficient of lateral diffusion was $1.6–4.8\times10^8$ cm²/sec. Flights were also made over Gulf of Mexico on Feb. 8 and 9. *Subject Headings:* **1. Atomic explosion products 2. Upper air wind trajectories.**—*C.E.P.B.*

8.8–106 551.594.14:623.454.8:551.557.2

Machta, L.; List, R. J. and Hubert, L. F. (*all, U. S. W. B., Wash., D. C.*), **World-wide travel of atomic debris.** *Science*, Wash., D. C., 124(3220):474–477, Sept. 14, **1956.** 5 figs., 4 refs. **DLC**—Upper winds (to 120,000 ft) measured during the 2 nuclear explosions "Mike" on Nov. 1, 1952 and "Bravo" on March 1, 1954 are shown for every 5000 ft level above the sea, and discussed in relation to general circulation in the mid-Pacific. Estimated paths for several days after each spot are shown on global charts, with figures plotted thereon to indicate number of days between detonation and observation of fission products at ground. Total radioactive fallout for 2–35 days after detonation is also shown on a chart for each test. Some debris was collected in Southern Hemisphere in each case, before any was reported from U. S., although amounts were very low (possibly due to washing out by rain in tropics before reaching Southern Hemisphere stations). Conclusion is that radioactive debris is not so good as a tracer because it must reach the ground (usually by rain) before it is detected by present networks. It has possibilities however. *Subject Headings:* **1. Radioactive fallout 2. World-wide fallout patterns.**—*M.R.*

8.8–107 551.511.6:551.594.14

†Marciano, J. J., **A theoretical study of atmospheric diffusion with applications to fallout from atomic clouds.** *U. S. Navy Electronic Laboratory, San Diego, Calif. Research Report, 663,* Feb. 17, **1956.** 28 p. fig., 32 refs., 76 eqs.—Methods and equations are developed for determining time of arrival, cumulative dose, total dose and fallout area for gaseous and solid debris diffusing from sources resembling atomic clouds in shape. One of the solutions is an improvement over previous approaches along the same line, another solution presented is believed to be new, while a third is based on an improved equation whose value in this application has been overlooked before. Although the solutions appear mathematically formidable, they are readily subject to graphic presentation and application. *Subject Headings:* **1. Radioactive fallout 2. Atmospheric diffusion.**—*Author's abstract.*

8.8–108 551.5:620.92:539.1

Meteorology and atomic energy. *Science*, 123(3205):976, June 1, 1956. **DWB**—The WMO Executive Committee announced establishment of a 4 man panel to study meteorological aspects of peaceful use of atomic energy and radioactive waste movements in atmosphere. A. I. Wexler of the U. S., A. A. Danilin of the U.S.S.R., B. Guilmet of France and P. J. Meade of England comprise the panel. Use of radioactive tracers in study of movements of air masses and ocean currents is to be studied but effects of atomic explosions on weather are discounted. *Subject Headings:* **1. Atomic energy meteorology 2. WMO. Panel on Meteorology and Atomic Energy.**—*M.R.*

8.8–109 551.594.14:519.24:551.501.45

Ogawara, M., **A method of testing the difference between Poisson parameters and its application to the observation method of radioactivity count number.** *Journal of Meteorological Research*, Tokyo, 7(11):746–747, Dec. 1955. 3 refs., 8 eqs. In Japanese. **DWB, DLC** – *Subject Headings:* **1. Radioactivity in the atmosphere 2. Statistical methods in meteorology.**

8.8–110 551.594.14:623.454.8

Rabinowitch, Eugene, **H-bombs without fall-out.** *Bulletin of the Atomic Scientists*, Chicago, 7(7):234, 264, Sept. **1956. DWB**—Fallout from hydrogen bombs can be minimized if the bomb is exploded at a high enough altitude (several miles instead of 1800 ft as for an atom bomb) so that dust is not sucked up into the column. Another way is to make a fission-fusion bomb instead of a fission-fusion-fission bomb which multiplies "a thousand-fold" the fission yield of the detonator. This latter bomb is called "inhuman" so the former could be called a "humanitarian" bomb as it would achieve maximum destructiveness without polluting the air and ground. *Subject Headings:* **1. Radioactive fallout 2. H-bomb.**—*M.R.*

8.8–111 551.594.1:539.6

Sheppard, P. A., **Natural and artificial trace elements in geophysical research.** *Nature*, London, 179(4568):996–997, May 18, **1957.** 3 refs. **DWB**—Account of discussion at Royal Astron. Soc., Feb. 1, 1957. After a general introduction on natural and artificial tracers, H. C. Urey spoke of O^{18}/O^{16} ratio in marine carbonates as indicating temperature of formation, and origin of water of thermal springs. L. H. N. Cooper suggested use of radioactive tracers in measurement of strong currents along edge of continental shelf. N. G. Stewart described results of sampling radioactive dust from atom and hydrogen bombs in air and rain. *Subject Heading:* **1. Radioactive tracers.**—*C.E.P.B.*

8.8–112 551.510:623.454.8

Smirnov, N. S., **K voprosu o vliianii atomnogo vzryva na sostoianie atmosfery.** [Problem of the influence of an atomic explosion on the state of the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 10:1227–1231, **1956. DLC**—The author reviews briefly various American, Western European and Japanese studies dealing with the effect of atomic explosions upon the state of atmosphere. He then considers the possible changes in the radiation radioactive properties of the atmosphere that can be caused by the explosion of one atomic bomb, how the increase in radioactivity can influence the radiation balance of the earth, the effect of atomic explosions upon the dust, ion and aerosol content of the atmosphere and the meteorological effects of atomic explosions such as the occurrence of fogs, etc. *Subject Heading:* **1. Atomic explosion effects on the atmosphere.**—*I.L.D.*

8.8–113 551.510.42:551.594.14:355(02)

U. S. Federal Civil Defense Administration, **Introduction to radioactive fallout: instructor's guide.** Wash., D. C., U. S. Govt. Print. Off., Sept. **1955.** 10 p. 20 refs. **DWB**—This publication is "an instructor's guide for a 2-hour session on fall-out." It contains an explanation of fallout describing its nature and its effects and directions for defense against fallout, such as protection against fallout, evacuation procedure, type of shelter needed and decontamination in civilian defense. A list of references on fallout and nuclear explosions is appended. *Subject Headings:* **1. Civilian defense 2. Radioactive fallout 3. Radioactive fallout manuals.**—*I.L.D.*

8.8–114 551.541:623.45

Yamamoto, Ryōzaburō (*Met. Res. Inst., Kyoto Univ.*), **Microbarographic oscillations produced by the explosions of hydrogen bombs in the Marshall Islands.** *American Meteorological Society, Bulletin*, 37(8):406–409, Oct. **1956.** 2 figs., 2 tables, 4 refs. **DWB**—The exact time that an oscillation (due to the explosion of a H-bomb) occurs on a microbarogram cannot be determined closer than ±5 min but where distances from source are great (i.e., from 2000 to 5000 mi) the time and hence the rate of propagation of the pressure wave through the atmosphere can be determined to some degree of accuracy. Many records for 14 island stations (shown on chart) in the Western Pacific were examined after explosions in Feb. 1952 and March, April and May 1954, and the speed of the wave toward the east found to be greater by 50 m/sec than that to the west, giving reasonable values for westerly winds in that vicinity and season. Stations located just to the west of Bikini showed no trace of the barometric oscillation. Mean value of speed of propagation was 336 m/sec to N.E. and 284 m/sec to N.W. *Subject Headings:* **1. Microbarograph oscillations from H-bomb waves 2. Explosion waves 3. Acoustical propagation 4. Bikini H-bomb tests, 1952–4 5. West Pacific Islands 5. Bikini atoll.**—*M.R.*

STATISTICAL

See also: **Radioactivity count number** (Ogawara), 8.8–109.

8.8–115 551.5:518.12 517.512.2

Holloway, Leith (*Systems Analysis Section, U. S. Weather Bureau, Wash., D. C.*), **Smoothing and filtering of meteorological time series and space fields.** Wash., D. C., U. S. Weather Bureau, May **1956.** 43 p. 7 figs., 20 refs., eqs. **DWB**—A theoretical analysis is made of the modification of meteorological time series and two-dimensional space fields affected by various numerical smoothing and filtering techniques. Several methods are given for determining the frequency response of smoothing and filtering functions, and desirable and undesirable response characteristics are pointed out. Methods for designing filters having specified frequency response are explained, and procedures for inverse smoothing are described. *Subject Headings:* **1. Mathematical techniques 2. Periodogram analysis.**—*Author's abstract.*

8.8–116 551.5:519.2

Kahn, Arthur B., **A generalization of average-correlation methods of spectrum analysis.** *Journal of Meteorology*, 14(1):9–17, Feb. **1957.** fig., 18 refs., 45 eqs. **DWB**—The power spectrum of truncated variables is developed as the transform of the correlation function of data smoothed by an arbitrary mean, as a function of both lag and averaging intervals. It is shown that a large class of techniques for computing spectra can be readily derived as special cases of this more general approach. These include the conventional approach of TAYLOR as well as various methods in current use. The need for further study of the numerical effects of the approximations used in applying these techniques to finite records of discrete data is indicated. *Subject Heading:* **1. Statistical analysis.**—*Author's abstract.*

8.8–117 551.501.45:519.2

Kivéliovitch, M. and Vialar, J., **Étude statistique des séries chronologiques.** [Statistical analysis of chronological series, Pts. 1–5.] *Journal Scientifique de la Météorologie*, Paris, 5(17-20):21–46; 75–87; 89-101; 129–143, Jan.–Dec. **1953**; 6(21):1–16, Jan./March **1954.** 30 figs., 16 charts, tables, 6 refs., 15 eqs. Also their: **Quelques nouvaux tests pour l'étude des séries chronologiques.** [More tests for the analysis of chronological series, Pts. 1–3.] *Ibid.*, 6(23,24):73–83; 151–166, July–Dec. **1954**; 7(27):259–271, July/Sept. 1955. tables, eqs. English and Spanish summaries. Also: Weiller, A. R., **Réflexions sur les tests du hasard de MM. Kivéliovitch et Vialar.** [Comments on the random distribution tests of Kivéliovitch and Vialar.] *Ibid.*, 7(27):295–299, July/Sept. **1955.** 2 refs., 17 eqs. Also: Kivéliovitch, M. and Vialar, J., [**Reply**], *Ibid.*, 7(28):383–384, Oct./Dec. 1955. Also their: **Comment déceler la présence du hasard dans l'observation des phénomenes naturels.** [How to detect the presence of random distribution in observations of natural phenomena.] *La Météorologie*, Paris, 4th Ser., No. 34:151–170, April/June **1954.** 14 figs., 9 tables. English and Spanish

summaries p. 151. Also: Jovičić, S., **Test o ispitivanju slučaja u brojnom nizu po M. Kiveljoviču.** [Test for analyzing chance in numerical series according to M. Kiveliovitch.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 5(3/4):77–93, July/Dec. **1956.** 9 figs., 3 refs., 15 eqs. **DWB**—In the first set of five articles the statistical laws governing the distribution of maxima, minima, phases, deviations and other characteristics of both continuous and discontinuous series are set forth. The resulting theory is applied to annual, monthly and daily values of precipitation, temperature, pressure and wind for Europe. The theory includes a test for determining whether a distribution is subject to a regularity or purely random. Applications of the test are shown on examples. Pt. 1 of the second set of articles is a continuation of the earlier work in respect to probabilities of maxima or minima and phases in series (probability of θijk of a phase i followed by phase j followed by phase k). Theory is elaborated and results of calculations expressed in tables. Confidence intervals are discussed and applications to monthly values of precipitation at Paris (Saint-Maur) for 1804–1950 and to distribution of numbers in roulette at Monte-Carlo on Feb. 24, 1939 worked out. It is concluded that latter are random but the former shows a weak organization of phases. Pt. 2 contains further development of the theory, and application to Lancashire Jan. temperatures 1781–1946, and the precipitation series for Paris, 1804–1950. The former (temperatures) are random and the latter slightly organized. In Pt. 3 the "intersection test" (a graphical method of analysis) is explained. This test yields quantitative results as opposed to the qualitative character of the tests considered earlier. Examples of the application of the "intersection test" are given in the field of random figures, grain price variations, Atlantic daily surface pressure changes, hourly pressure at Hong Kong, wind direction at Algiers and wind speed and daily pressure at Kerguelen. A table of confidence intervals is added. Weiller shows that the Kivéliovitch-Vialar test of random distribution is perfectly valid if the result is outside the confidence limits (i.e., when it can be concluded that the series investigated is subject to some regularity). If the result is inside the confidence limits, however, random distribution may not be assumed to prevail without further tests (not included in the Kivéliovitch-Vialar procedure) which involve lengthy computations. Weiller's criticism is rejected. Jovicic gives a good summary of the Kivéliovitch method and applies it to temperature at Belgrade (1888–1954) and precipitation at Ljubljana (1851–1953) and Zagreb (1862–1953). *Subject Headings:* **1. Statistics in climatology 2. Series analysis 3. Long period records 4. Paris, France 5. Lancashire, Eng. 6. Algiers 7. Hong Kong 8. Kerguelen Island 9. Yugoslavia.**—*M.R., G.T.*

8.8–118 519.241.6

Mittmann, O. M. J., **Varianz-Untersuchungen bei stationären Variablen.** [Variance investigations with stationary variables.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. A*, 9(4):519–523, **1957.** 6 tables, ref. German, English and French summaries p. 519. **DWB**—Sets out a method for finding the variance of the arithmetic mean of a time series or other series of observations. *Subject Heading:* **1. Statistical techniques.** —*C.E.P.B.*

8.8–119 551.5:518

Nicholls, K. V. W., **Some mathematical fragments and formulae.** *East Africa High Commission. Meteorological Dept., Technical Memorandum*, No. 2, **1952.** 14 p. 3 figs., numerous eqs. **DWB**—A few mathematical solutions worked out by the author for use in the meteorological service of East Africa, are presented here. These are: 1) the incomplete factorial function (Gamma function) used in turbulence theory, 2) terminal velocity of bodies falling against air resistance (used in locust research), 3) altitude of sun at any hour, 4) formulas for standard atmosphere (pressure and density vs height) and constants used, 5) pressure altitude and lapse rate, 6) QNH (altimeter setting). *Subject Headings:* **1. Mathematics in meteorology 2. Incomplete gamma function 3. Standard atmosphere.** —*M.R.*

8.8–120 533.4:551.547.1

Pütter, Paul Stefan, **Anwendung der dynamischen Grundgleichungen der klassischen Statistik.** [Application of the fundamental dynamic equations to classical statistics.] *Annalen der Physik*, Leipzig, 6 Ser., 19(3/5):247–256, **1956.** 34 eqs. **DLC**—Two applications of the system of partial differential equations of the classical system of symmetrical spherical

particles are made, the second being a derivation of the barometric formula. *Subject Heading* **1. Barometric formula.**—*C.E.P.B.*

8.8–121 519.24:551.583.1

Schumann, T. E. W., **The frequency distribution of deviations resulting from a simple harmonic motion superimposed upon random fluctuations.** *South Africa. Weather Bureau Notos*, 5(2):114-116, **1956.** 2 figs., 2 tables, ref., 11 eqs. **DWB**—The fluctuations in the values of certain meteorological elements exhibit a well-defined harmonic component coupled with a random component. An expression for the frequency distribution applicable to such cases is here derived, and a number of frequency curves, computed from the general expression are presented. *Subject Headings:* **1. Frequency distributions 2. Quasi-periodic phenomena**—*Author's abstract.*

8.8–122 551.501:546.214:551.510.41

Rasool, Ishtiaq and Vassy, Arlette, **Remarques sur les méthodes chimiques de dosage de l'ozone atmosphérique.** [Remarks on the methods of chemical sampling of atmospheric ozone.] *Académie des Sciences, Paris, Comptes Rendus*, 243(3):298–299, July 16, **1956** table, 5 refs. **DLC**—Atmospheric ozone concentration near the ground was measured by two methods: chemical sampling and optical measurement. A comparison of the results shows that chemical sampling is accurate in itself, even at very low concentrations, but difficulties arise from poor exchange of air in the absence of wind. *Subject Heading:* **1. Ozone measurement techniques.**—*Trans. of authors' abstract.*

METEOROLOGICAL OBSERVATIONS AND INSTRUMENTS

METHODS OF OBSERVATION

See also: **Raindrop size distribution and radar reflectivity** (Jones), 8.8–28; **Jan Mayen weather station, World War II** (Dage), 8.8–43; **Radioactivity count** (Ogawara), 8.8–109; **Statistical analysis of chronological series** (Kivéliovitch, Vialar), 8.8–117; **Temp. measurement** (Saito), 8.8–154; **Stratospheric radiation calculation** (Curtis, Goody), 8.8–216; **Computation tables for pressure pattern flying** (Warntz), 8.8–236; **Radar analysis of clouds** (Harper et al.), 8.8–269.

8.8–123 551.501.1(02):495.6

Japan. Central Meteorological Observatory, Tokyo, **Chijô kishô kansoku-hô.** [Methods of meteorological observation.] Issued by the Observatory, **1956.** 193+10 p. 14 figs., 41 plates, tables, eqs. **DWB**—A standard manual of surface observations, including instructions for the use of basic instruments, reporting of cloud forms according to the International Cloud Atlas, and observation of various hydrometeors, optical and electric phenomena. *Subject Headings:* **1. Observers manuals 2. Japanese language manuals.**—*G.T.*

8.8–124 551.501.45:551.571.36

Maksic, B., **Die dynamische Erklärung und synoptische Verwertung der extrem niedrigen Feuchtigkeitsgrade, die an Höhenstationen beobachtet werden.** [Dynamic explanation and synoptic evaluation of extremely low relative humidities observed at high altitude stations.] *Wetter und Leben*, 5(1/2):7–9, March **1953. DLC**—The indirect determination of extreme relative humidities in those instances when hygrography registers below the 0°C line is discussed. A specific instance of such an occurrence at the Sljeme Observatory (Zagreb) and the accompanying synoptic conditions are described. A probable relative humidity of 5% is calculated on the basis of computations involving vertical velocity of subsidence, the time and height intervals in which subsidence took place, using the formula $U = C \cdot \frac{T \frac{1}{x}}{(ET)}$; where $E(T)$ = vapor pressure of saturated vapor pressure at temperature T. $1/x = 3.511$ and C a constant depending upon the vertical state of the atmosphere. *Subject Headings:* **1. Humidity extremes 2. Humidity computations.**—*I.L.D.*

8.8–125 551.501.7:551.557(98)

Keegan, Thomas J., **A method of synthesizing high-level wind climatology.** (In: Russell, Pamela and Ballabon, Maurice B. (*eds.*), **Informal papers in Arctic meteorology.** McGill Univ. Arctic Meteorological Group, Contract AF 19(604)-1141, Scientific Report, No. 1, Dec. 15, **1955.** p. 41–48. 2 figs., table, 9 refs., eq.)—Significant studies of the distribution of high level winds have neglected the high latitude areas of the world, particularly for altitudes above 500 mb. Lack of observational data at high levels necessitates extrapolation from lower level data, and the "difference technique," which uses mean shear rather than mean wind as a statistical base, has been employed. The vector mean wind, resultant direction, mean wind speed, wind constancy, and standard vector deviation have been interpolated for high-level winds at the Arctic stations of Alert and Barrow. *Subject Headings:* **1. Upper air wind computation 2. Arctic.**—*Author's abstract.*

8.8–126 551.501.8:551.594.5

Forsyth, P. A. and Vogan, E. L., **The frequency dependence of radio reflections from aurora.** *Journal of Atmospheric and Terrestrial Physics*, 10(4):215–228, **1957.** 6 figs., 10 refs., 10 eqs. **DWB**—Auroral radio reflections on 4 frequencies (32–50 Mc/s) transmitted from Greenwood, Nova Scotia, were received at Ottawa, 860 km to west. Periods of enhanced signals on one or more frequencies were often associated with auroral activity. Results are compared with those expected with various reflection mechanisms. They point conclusively to small auroral scattering centers in which ionization is sufficient to cause complete reflection, but suggest that localized absorbing regions are associated with each auroral display. *Subject Heading:* **1. Radio echoes from auroras.**—*C.E.P.B.*

8.8–127 551.501.8:551.515.4:551.578.7

Roncali, G., **Sur l'emploi du radar dans la lutte contre la grêle.** [Use of radar in the fight against hail.] *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 67–68. ref. **DWB**—In 1952, radar of the marine type with a wave length of 3.2 cm was installed at Verona in order to facilitate forecasts of hail producing clouds and to study clouds in relation to hail. Since with the aid of radar it is possible to exclude when the clouds either do not produce echoes or produce only faint ones, the time interval between the first observed echoes and the fall of hail is always more than 30 min at Verona. The result of the development of clouds from which hail has begun to fall is described. *Subject Headings:* **1. Radar hail warnings 2. Verona, Italy.**—*I.L.D.*

8.8–128 551.501.8:551.515.4

Mitra, H. (*Met. Office, New Delhi*), **Radar observations of a thunderstorm.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(2):119–136, April **1955.** 30 figs. (incl. photos), 2 tables, 7 refs. **DWB, DLC**—The paper describes the results of a study of a winter thunderstorm which occurred at New Delhi between 2150 IST of the 14th and 0030 IST of 15 Jan. 1953 due to the passage of a western disturbance. The radar echoes as seen on the scope of a 3-cm AN/APQ-13 set have been explained with the help of the available surface and upper air data. The mechanism of formation and decay of the main thunderstorm cell and its associated secondaries have been described with the help of radar photographs taken at short intervals. *Subject Headings:* **1. Radar thunderstorm observation 2. New Delhi, India.**—*Author's abstract.*

8.8–129 551.501.81:551.578.4

Douglas, R. H.; Gunn, K. L. S. and Marshall, J. S., **Pattern in the vertical of snow generation.** *Journal of Meteorology*, 14(2):95–114, April **1957.** 22 figs., table, 18 refs., 8 eqs. **DWB**—Time and height of passage of snow elements were recorded by 3-cm radar pointed to zenith, and correlated with upper air data, Jan. 1–Feb. 18, 1954. Most of the record of nearly every storm shows almost horizontal trails 10–50 mi long, formed in generating cells between 11,000 and 20,000 ft, −12 to −34°C, in lower stable part of maritime polar air mass. Terminal speed 1–6 ft/sec. At beginning of storm, radar usually detects snow aloft before it reaches ground. One-third of storms show downward extrusions ("stalactites") associated with a layer of dry air. Last third of storm gives a homogeneous echo subsiding about 1000 ft/hr.

In Pt. 2 it is shown that convection resulting from release of latent heat of sublimation by growing ice crystals may result in vertical development comparable to observed depth of snow-generating cells, with updrafts comparable to terminal speeds of ice crystals. A supercooled water cloud inhibits sublimation updraft, hence shear and turbulence may appear across a cloud boundary. Desiccation of a stratified water cloud is suggested as the basis of a snow generating cell. (Publ. version of 8.4–85, April 1957, *MAB.*) *Subject Heading:* **1. Radar echoes from snow.**—*C.E.P.B.*

8.8–130 551.501.81:551.577

Gupta, B. K.; Mani, A. M. and Venkiteshwaran, S. P. (*all, Met. Office, Poona*), **Radar observations of rain at Poona.** *Indian Journal of Meteorology and Geophysics*, Delhi, 6(1):31–40, Jan. **1955.** 8 figs. (incl. photos), 2 tables, 7 refs. **DWB, DLC**—The contents of this study include a description of the radar equipment SCR717C operating at a wave length of 9.7 cm, the mobile radar unit, observations of radar echoes during the southwest monsoon in 1952 and radar observations of thunderstorms at Poona. Photographs of the radar equipment and radar photographs, showing the formation and dissipation of rain cells and thunderstorms, are presented. *Subject Headings:* **1. Radar observations 2. Radar precipitation echoes 3. Radar echoes from thunderstorms 4. Poona, India.**—*I.L.D.*

8.8–131 551.501.9

Barlow, John, **Building your own weather station.** Los Angeles, California Education Press, **1954.** 25 p. 4 figs., tables, 8 refs. **DLC**—The project initiated by the author, involving the setting up and operation of a weather station by a "Weather Club" of Central School in Escondido, Calif. (near San Diego), is described. Methods used to build a mechanical barometer, instrument shelter, rain gage, anemometers, a nephoscope, and to install and operate these instruments and thermometers, psychrometers, etc., to keep records and to issue reports to the public with cooperation of the Weather Bureau, Chamber of Commerce and TV stations in San Diego, are discussed for the benefit of other elementary or secondary schools wishing to undertake similar projects. *Subject Headings:* **1. Amateur weather stations 2. Escondido, Calif.**—*M.R.*

8.8–132 551.501.9(411)

Halstead, Cyril A., **Climatic observations in Scotland.** *Scottish Geographical Magazine*, 72(1):21–23, April **1956.** fig., table. **DLC**—There are serious gaps in knowledge of the upland climate of Scotland. A map shows the distribution of stations. None are above 1500 ft and only 5 above 1000 ft; nearly all are below 300 ft. The distribution of rain gages is much better. *Subject Headings:* **1. Networks 2. Scotland.**—*C.E.P.B.*

8.8–133 551.501.9

Seydl, Otto, **Meteorologická plošina při pražské hvězdárne v Klementinu.** [Meteorological instrument platform at the Prague Astronomical Observatory.] *Meteorologické Zprávy*, Prague, 7(5):130–132, **1954.** 3 figs. **DLC**—Brief history of a meteorological instrument platform built on the roof of Prague Astronomical Observatory in 1877. Wind speed and direction and rainfall were measured (anemograph, wind vane and rain gages) up to 1931, when the platform had to be dismantled. The new platform, mounted in 1934, carries rain gages only. The old and new platforms and the recording room are shown in photographs. *Subject Headings:* **1. Meteorological instrument sites 2. Prague Astronomical Observatory.**—*G.T.*

8.8–134 551.501.9:551.582(68)

Van Rooy, M. P. and Drummond, A. J., **A meteorological safari.** *Weather*, 11(5):141–146, May **1956.** fig., 2 tables. **DWB**—Account of a journey by motor truck to install solar radiation equipment at Maun in Bechuanaland and to inspect stations. Temperature and rainfall at 8 stations are tabulated. The total mileage was 2008 over bad roads. *Subject Headings:* **1. Meteorological stations 2. Climate of Bechuanaland 3. Bechuanaland.**—*C.E.P.B.*

OBSERVATIONAL DATA

See also: **Lightship obs. data, North Sea** (Netherlands. Met. Inst.), 8.8–24; **Climatic data of Netherlands lightships, 1910–1950** (Verploegh), 8.8–25; **Turbulence effect on aircraft operation** (Sugimoto), 8.8–84; **Weather effects on milk production** (Ádám, Batta), 8.8–85; **Analysis of observations of Met. Res. Flight, 1950–52** (Sawyer), 8.8–215; **Actinometric data, Oporto, Portugal,** 8.8–220; **Atmos. potential gradient data,** 8.8–307.

8.8–135 551.506:551.509.21

Booth, R. E., **Comparison of weather conditions during July and August 1954 and 1955.** *Meteorological Magazine*, London, 85(1009):211–215, July **1955.** 5 figs., ref. **DWB**—Upper air synoptic conditions in the cool rainy summer of 1954 and the fine summer of 1955 are contrasted. Mean 500 mb contours for July 1955 show a sustained blocking pattern over or near the British Isles, which was absent in July 1954. *Subject Headings:* **1. Synoptic patterns 2. Weather anomalies 3. British Isles.**—*C.E.P.B.*

8.8–136 551.506:551.43(411)

Green, F. H. W., **Weather observations on Beinn Eighe and Ben Lawers, 1954.** *Weather*, London, 11(7):209–217, July **1956.** 5 figs. **DWB**—Observations were made at 3 points, 1000–2800 ft, on Beinn Eighe in Ross-shire on July 4–16, 1954. The lapses of wet and dry bulb and variations of humidity are plotted. Another series Aug. 18–30 at 3 stations 2350–3985 ft on Ben Lawers is described; the effects of the strong winds were especially noticeable. *Subject Headings:* **1. Mountain observations 2. Scotland.**—*C.E.P.B.*

8.8–137 551.506:551.515.711

*Miles, M. K., **Whitsun holiday, 1955: eleventh hour recovery of a "blocking anticyclone."** *Weather*, 10(7):237–239, July **1955.** 3 figs. **DWB**—After a fall of pressure on May 25–27, a ridge built up unexpectedly over Britain on May 28–30, giving fine warm weather. *Subject Headings:* **1. Anticyclogenesis 2. British Isles.**—*C.E.P.B.*

8.8–138 551.506(429)

Thomas, Trevor M., **Topography and weather in south-west Pembrokeshire.** *Weather*, 11(6):183–186, June **1956. DWB**—The exposed Dale peninsula was the site of two airfields. Local weather is described—coastal fog and low stratus, gales, frontal thunderstorms and seabreezes—and some forecasting problems mentioned. *Subject Headings:* **1. Weather of Pembrokeshire, Wales 2. Pembrokeshire, Wales.**—*C.E.P.B.*

8.8–139 551.506.1(62)

*Helwan, Egypt. Observatory, **Meteorological Report, 1952.** Cairo, Cairo Univ. Press, **1953.** 59 p. almost entirely tables. Also **Meteorological Report, 1953.** pub. **1954.** 61 p. **DWB**—Yearbooks contain daily pressure, and hourly anomalies or departures, daily temperature and departures, maximum and minimum temperatures, relative humidity and departures, vapor pressure and departures, wind direction and speed at 8, 11, 14, 17 and 20h each day, average daily speed and departure, maximum speeds, direction and time, average monthly of speeds by 8 directions, clouds at 5 synoptic hours, actinometric data at 14h each day (bright bulb, black bulb and difference), sunshine duration, visibility at 14h each day, rainfall, evaporation from Piché evaporimeter, and daily Pibal observations to 12 km, with summary for each month by direction and speed groups at each height and radiosonde data for 4 months of 1952 and 1953 whenever ascents were made. *Subject Headings:* **1. Annual meteorological data summaries 2. Annual upper air wind data 3. Observational data 4. Radiosonde data 5. Helwan, Egypt. I. Samaha, A. H.** (*ed.*) **II. Madwar, M. R.** (*ed.*).—*M.R.*

8.8–140 551.506.1:551.579(455)(058)

*Italy. Ufficio Idrografico, Pisa, **Annali Idrologici . . . per i Bacini dell'Arno e limitrofi tra il Magra ed il Fiora.** [Hydrological yearbook for the basin of the Arno between the Magra and the Fiora.] Earliest issue seen, **1943,** pub. Rome, **1955.** Latest issue seen, **1954, Pt. I,** pub. **1957.** Annual. 1951(?)—issued in 2 parts. Paging varies (**1953, Pt. 1,** 165 p.). Almost

entirely tables. **DWB**—In these yearbooks the meteorological and hydrological data, including the daily maximum and minimum temperatures and monthly means and extremes for 60 stations, and the daily and monthly precipitation (and number of days) for 360 stations in the Arno Valley and vicinity are given in the standard form for hydrological yearbooks in various regions of Italy and Sicily (*see* 3.10–47, October 1952, *and* 5.9–45, Sept. 1954, *MAB*). Maximum intensity of precipitation, snow cover and runoff data in Pt. I and river data. In some of the volumes, graphs, charts and studies of flood conditions are included. For instance the 1949 yearbook contains a 20 page report on floods of Oct. 27 and Nov. 26 and 27, 1949, including hydrographs and excellent photographs. *Subject Headings:* **1. Annual meteorological data summaries 2. Hydrologic yearbooks 3. Temperature data 4. Precipitation data 5. Arno Valley, Italy.**—*M.R.*

8.8–141 551.506.1(058)(679)

*Mozambique. Serviço Meteorológico, **Anuario de Observações,** [Yearbook of Observations], **Vol. 1, 1909–** Latest issue seen, **Vol. 46, 1954,** issued Lourenço Marques, **1955.** Annual. almost entirely tables. Currently issued in two parts (in one binding), **Pt. 1, Observações astrónomicas. Pt. 2, Observações meteorológicas. Vol. 1–42, 1909–1950** issued as **Relatorio do Observatorio** by Mozambique. Observatorio Campos Rodrigues, Lourenço Marques. **DWB**—In addition to 11 pages of astronomical data, this large format yearbook contains tables for 8 first order, 33 second order and 71 climatological stations. Complete tables for each month are presented for Lourenço Marques, Inhambane, Beira, Tete, Quelimane, Mossuril and Porto Amélia. These consist of daily (bi-hourly) pressure, temperature, vapor pressure, relative humidity, wind direction and speed, plus frequency of wind (16 directions), and of each element according to wind direction, daily evaporation, precipitation, temperature of soil (surface 0.5, 1.0, 2.0 and 3.0 m), of thermometer exposed to sun and actinometer data for 9, 12 and 15 h for Lourenço Marques and monthly averages of hourly pressure, temperature, vapor pressure, relative humidity, cloudiness, visibility, etc. for all of the 1st order stations. Simpler summaries are presented for 2nd order, and simpler yet for climate stations. *Subject Headings:* **1. Annual meteorological data summaries 2. Observational data 3. Mozambique.**—*M.R.*

8.8–142 551.506.1(410):551.589

Veryard, R. G., **Looking back on 1955.** *Weather,* 11(3):83–88, March **1956. DWB**—Account of weather month by month in Britain and comparison with 1954. In 1955 the trough-ridge systems from Canada to Scandinavia were dominated by blocking ridges. The "moodiness" of the year in other parts of the world is briefly surveyed. *Subject Headings:* **1. Weather reports 2. Synoptic climatology 3. British Isles.**—*C.E.P.B.*

8.8–143 551.506.2(411):551.577.37:551.577.61:551.579.4

Learmonth, A. T. A., **The floods of 12th August, 1948, in south east Scotland.** [Liverpool, Univ. Dept. Geog., **1950.**] 23 plates. Comment by A. Scott p. 43–45. 111 p. (incl. Append.). 19 refs. Abstracted from photographic copy.—Exceptionally heavy rainfall on Aug. 12, on ground already saturated (exceeding 6 in. in part of Tweed Valley; charts given), caused severe floods and great damage by gullying, landslides and destruction of bridges. A full discussion of the factors of damage, remedial measures and rehabilitation is given. *Subject Headings:* **1. Excessive rainfall 2. Floods 3. Scotland. I. Scott, A.**—*C.E.P.B.*

8.8–144 551.506.2:551.578.43(713)

Thomas, M. K., **Toronto's winter of minimum snowfall.** *Weather,* 9(4):110–111, April **1954.** 2 tables. **DWB**—During winter of 1952–53 more than 4000 sq. mi in Ontario, including Toronto, had the least snowfall since at latest 1839. It was the second warmest winter. *Subject Headings:* **1. Snowfall extremes 2. Ontario.**—*C.E.P.B.*

8.8–145 551.506.3:551.524.35

Dassler, R., **Bemerkungen zur Bamberger Winterreihe 1879/80 bis 1949/50.** [Remarks on Bamberg winters.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte,* No. 42:326–331, **1952.** 4 figs., 4 tables, 5 refs. **DWB**—Sums of negative daily mean temperatures

are tabulated monthly Nov.–March for each year and secular trend related to Berlin (1771–1950). Frequency distribution of sums is tabulated and winters classified into 8 types. Sums are plotted for each day. *Subject Headings:* **1. Abnormal winters 2. Bamberg, Germany.** —*C.E.P.B.*

8.8–146 551.506.7(426.1)

Great Britain. Meteorological Office, **Upper air data for stations maintained by the Meteorological Office. Summaries of radio-sonde observations of temperature and humidity and of radar wind measurements at standard pressure levels, 1946–50. Pt. 9. Downham Market.** London, **1956.** 9+54 p. 5 plates, 5 tables, 12 refs. At head of t.-p. MO 555, Pt. 9. **DWB**—Following the usual lines, gives monthly temperature averages at standard levels, 60 mb to surface, means for individual months, and frequency distributions at 2, 8, 14 and 20 hrs, tropopause temperature and pressure, heights of standard pressure levels, relative humidity frequencies and mixing ratios, wind direction and speed at pressure levels. Downham Market, Eng. is at 52°36′N, 00°24′E, elevation 121 ft. Data are also shown graphically. *Subject Headings:* **1. Upper air data 2. Downham Market, Eng.**—*C.E.P.B.*

8.8–147 551.506.8(426)

Balls, W. Lawrence, **Seven garden seasons.** *Weather*, 11(3):71–73, March **1956.** fig., ref. **DWB**—A graph is given of dates of flowering of 23 garden plants near Cambridge each year from 1949 through 1955. *Subject Headings:* **1. Phenological data 2. Cambridge, Eng.** —*C.E.P.B.*

8.8–148 551.506.8:551.588.7:582.931

Franken, E., **Der Beginn der Forsythienblüte in Hamburg 1955. Ein Beitrag zur Phänologie der Grosstadt.** [The start of Forsythia flowering in Hamburg 1955. A contribution to the phenology of a large town.] *Meteorologische Rundschau*, Berlin, 8(7/8):113–114, July/Aug. **1955.** 2 figs., 3 refs. **DLC**—The effect of higher city temperature is shown in the earlier flowering of plants. The flowering of Forsythia in 1955 was charted with the help of the *Hamburger Abendblatt*. It began before April 21 in parts of the built-up area and after April 28 in parts of the outskirts. The temperature difference ranged up to 1°C. *Subject Headings:* **1. Phenology 2. Urban influences 3. Forsythia 4. Hamburg, Germany.**—*C.E.P.B.*

8.8–149 551.506.8:551.582.3

Schnelle, Fritz, **Karte der naturräumlichen Gliederungen im mittleren Europe auf Grund phänologischer Unterlagen.** [Chart of the natural divisions in central Europe on a phenological basis.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 42:320–322, **1952.** chart, 6 refs. **DWB**—The chart (France to 40°E) shows date of beginning of apple blossom and duration of main vegetation period (to winter rye harvest). *Subject Headings:* **1. Phenology 2. Europe.**—*C.E.P.B.*

INSTRUMENT CARRIERS

See: **Guided missiles bibliog.** (U. S. Dept. of Army Library), 8.8–81; **Ozone-concentration measurement from aircraft, Norway** (Bremer), 8.8–179; **Rocket spectrograph obs.** (Jursa et al.), 8.8–223.

INSTRUMENTS

See also: **North Rhine-Westphalia wind protection mobile station** (Scultetus), 8.8–53; **Ozone-concentration measurement from aircraft, Norway** (Brewer), 8.8–179; **Radiosonde radiation instruments** (Brewer et al.), 8.8–222.

8.8–150 551.508:551.584

Long, I. F., **Instruments for micro-meteorology.** *Royal Meteorological Society, Quarterly Journal*, 83(356):202–214, April **1957.** 9 figs., table, 10 refs. **DWB**—Some modified or

special instruments for use in small spaces in growing crops are described. These include a portable thermistor bridge used as continuous recording wet- and dry-bulb resistance thermometers, nickel resistance thermometers as dry- and wet-soil or leaf thermometers, all designed to work into a linear resistance recorder. Anemometers include continuously recording cup types (large and small) and a semi-integrating "hot bulb" anemometer. *Subject Heading:* **1. Micrometeorological instruments.**—*C.E.P.B.*

8.8–151 551.508.21:551.521.61:535.243

Hilsum, C. and Ross, I. M., **An infra-red photocell based on the photoelectromagnetic effect in indium antimonide.** *Nature*, London, 179(4551):146, Jan. 19, **1957.** 2 figs., 4 refs. **DWB**—Describes a photocell consisting of a $2\times1\times0.1$ mm crystal slice of indium antimonide in a ring magnet. The spectral sensitivity is plotted. *Subject Headings:* **1. Infrared radiation instruments 2. Photoelectric cells.**—*C.E.P.B.*

8.8–152 551.508.21

Rodskjer, Niels, **The Aurén solarimeter.** *Arkiv för Geofysik*, Stockholm, 2(17):385–393, **1955.** 4 tables, 8 refs. **DLC.** Also issued as *Uppsala. Universitetet. Meteorologiska Institutionen, Meddelande*, No. 47, **1955. DLC**—Short description of a solarimeter is given. Performance was tested in laboratory. Sudden temperature changes caused a zero displacement. The reduction factor of the instrument for obtaining the global radiation was determined by a tube method. A constant factor is recommended for evaluation purposes, since its dependence on cloudiness and solar height is not known yet with sufficient accuracy. *Subject Headings:* **1. Solarimeters 2. Aurén solarimeter 3. Global radiation measurement.** —*A.A.*

8.8–153 551.508.21

Rodskjer, Niels, **The uviometer, an actinometer constructed by T. E. Aurén.** *Arkiv för Geofysik*, Stockholm, 2(16):377–384, **1955.** 2 figs., 2 tables, 6 refs., 22 eqs. Also issued as *Uppsala. Universitetet. Meteorologiska Institutionen, Meddelande*, No. 46, **1955. DLC**—Aurén's actinometer for the wave lengths 3130–4040 Å in the direct solar radiation was carefully checked for accuracy. Temperature influences the calibration. In comparison with the Ångström compensation pyrheliometer, the instrument gives slightly lower values. Absorption coefficient is 0.945. *Subject Headings:* **1. Actinometers 2. Aurén actinometer 3. Ångström pyrheliometer.**—*A.A.*

8.8–154 551.508.24 551.501:551.524

Saito, R., **On the homogeneity of observed values of air temperature.** *Journal of Meteorological Research*, Tokyo, 8(1):20–24, March **1956.** 3 figs., table, 2 refs. In Japanese; English summary p. 20. **DWB, DLC**—Since Jan. 1, 1950, air temperature has been measured at the stations of the Central Meteorological Observatory of Japan with thermometers ventilated by means of fans driven by a pulled-up weight or an electric motor. In this paper the difference between the temperature readings of the ventilated thermometer and that of the non-ventilated thermometer is investigated, using comparative observations taken at 82 weather stations in 1939. Mean values of the differences of temperature readings taken simultaneously with thermometers of different types are generally below 0.1°C. Consequently the heterogeneity resulting from adoption of the ventilation method is not as serious as might be feared. *Subject Headings:* **1. Temperature measurement 2. Aspiration thermometers.** —*From author's abstract.*

8.8–155 551.508.25:551.521.64

Manning, Armin W., **Measurements of the soft component of cosmic radiation by an absorption "well method."** *Journal of Atmospheric and Terrestrial Physics*, 10(4):189–193, **1957.** 3 figs., table, 7 refs. **DWB**—The soft component, defined as that part absorbed by 10 cm iron, was measured at Bronxville, N. Y., with an ionization chamber even with top of an iron house and then sunk to half its height in the house. The difference in mean fraction of ionization absorbed is 0.13 times soft component. Values ranged from 0.39–2.15 ion pairs/

sec. Maximum was on Feb. 23, when there were violent solar eruptions; other fluctuations are attributed to atomic detonations. *Subject Heading:* **1. Cosmic ray measurement.**—*C.E.P.B.*

Garvitch, Z. S. and Probine, M. C., **Soil thermometers.** *Nature*, London, 177(4522): 1245–1246, June 30, **1956.** Also MacDowall, J., **Soil thermometers.** *Ibid.*, 179(4554):328, Feb. 9, **1957.** ref. **DWB**—Calibration of a number of 1 ft earth thermometers with wax showed errors ranging up to 8°F. This was due to pressure on the bulb by contraction of the wax at low temperatures. Referring to Garvitch and Probine, McDowall states that errors of soil thermometers at 30°F can be avoided by replacing paraffin wax lagging by a micro-crystalline wax of greater plasticity. *Subject Heading:* **1. Soil thermometer errors.**—*C.E.P.B.*

8.8–157 551.508.51

Needham, A., **Some old and new weathervanes.** *Weather*, 12(5):158–159, May **1957.** fig. **DWB**—Introductory article to a series of pictures to be reproduced in *Weather*. Example shown is from a school in Greenwich, London. *Subject Heading:* **1. Wind vanes.**—*C.E.P.B.*

8.8–158 551.508.53

Hartley, G. E. W., **A wind-vane for recording or indicating mean wind direction.** *Meteorological Magazine*, London, 86(1018):111–114, April **1957.** 2 plates, table. **DWB**—A damping system built in to the vane, so that movements of vane spindle show mean direction, is described and working parts illustrated. Tests in a wind tunnel and natural winds were satisfactory above 10 kn but below 5 kn trace did not follow instantaneous trace. *Subject Heading:* **1. Wind vanes.**—*C.E.P.B.*

8.8–159 551.508.54

Rae, A. G. A., **Response characteristics of the sensitive cup anemometer Type IV.** *Great Britain. Meteorological Research Committee, M. R. Papers*, No. 1032, 25 Jan. **1957.** 4 p., 4 figs., plate, ref. Mimeo. **DWB**—Wind tunnel tests of the anemometer showed errors due to : 1) Orientation of contact housing relative to wind direction (2%); the only satisfactory solution would be to redesign the instrument to be cylindrically symmetrical; 2) orientation of supporting arm relative to wind (small); 3) varying distance of anemometer from mast (decreasing with distance). *Subject Heading:* **1. Cup anemometer.**—*C.E.P.B.*

8.8–160 551.508.761

Georgi, J., **The photographic sky-mirror.** *Weather*, 12(5):149–153, May **1957.** 4 figs., 2 plates, 6 refs. **DWB**—Description of a spherical glass mirror and camera, also a portable model. Calibration is set out. Advantages and uses are set out with examples. (*See also* 7.7–109, July 1956, *MAB.*) *Subject Heading:* **1. Cloud cameras.**—*C.E.P.B.*

8.8–161 551.508.765

Liddell, H. F. and Wootten, N. W., **The detection and measurement of water droplets.** *Royal Meteorological Society, Quarterly Journal*, 83(356):263–266, April **1957.** 4 figs., 6 refs. **DWB**—Small droplets can be measured by Naphthol Green B in a thin film of gelatine on the slides of a cascade impactor. Each droplet on drying leaves a dark ring. Calibration and procedure are described. A country fog gave 28% of drops $<1\mu$ diameter. *Subject Heading:* **1. Drop size distribution instruments.**—*C.E.P.B.*

8.8–162 551.508.765:551.578.11

Magarvey, R. H., **Stain method of drop-size determination.** *Journal of Meteorology*, 14(2):182–184, April **1957.** 2 figs., 7 refs., 3 eqs. **DWB**—Drops of 0.5–10.5 mm diameter fell on filter paper dusted with blue aniline dye. Stain diameter S plotted against drop diameter D gave $D=(1/3)S^b$, where $b=0.75$ for $D>1.5$ mm and 0.93 for $D<1.5$ mm; b is independent of impact velocity but varies with drying time. *Subject Heading:* **1. Drop size measurement.**—*C.E.P.B.*

8.8–163 551.508.91:551.574.1

Pollak, L. W.; Murphy, T. and O'Connor, T. C., **The uncertainties in measurements of concentration of condensation nuclei with photoelectric counters and the decay of nuclei in large vessels.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings*, London, Butterworth, **1956.** p. 369–373. 2 tables, 5 refs., 2 eqs. **DWB**—The author discusses various mechanical and operational factors which are associated with differences in condensation nuclei counts with different photoelectric counters using either a pivot micrometer or a reflecting galvanometer to measure the current in the photocell. The rate of disappearance of condensation nuclei in a closed vessel is described mathematically and experimental results of studies on the decay of room air nuclei and the variation of their size in a large vessel are presented. *Subject Heading:* **1. Condensation nuclei measurement.** *–I.L.D.*

8.8–164 551.508.92

Bibby, J. R., **A fog-density indicator.** *Meteorological Magazine*, London, 86(1018):117–119, April **1957.** plate. **DWB**—A drawing is given of an instrument to be carried by a tethered balloon to measure depth and structure of a fog layer at night. Light from 3 lamps is reflected by fog particles on to selenium photo-electric cells, and the current measured on the ground. It was calibrated and used at Cardington. (*See also* 7.8–82, Aug. 1956, *MAB.*) *Subject Heading:* **1. Balloon fog meters.**—*C.E.P.B.*

8.8–165 551.508.92

Bibby, J. R., **Photo-electric visibility meter Mk. II.** *Great Britain. Meteorological Research Committee, M. R. Papers*, No. 1033, Jan. 18, **1957.** 6 p. 5 figs., 2 tables, 3 refs. Mimeo. **DWB**—An instrument installed at London Airport in 1951 measures attenuation of a horizontal beam of light over 300 yds, using a selenium photocell recording on a Cambridge thread recorder. Set-up, operation and interpretation of results are described. Observations in 1954–55 are compared with visual observations for visibilities 3000–1000 yds and 1000–250 yds. Instrumental readings average too high by about 13%; large differences are probably due to atmospheric inhomogeneity. *Subject Heading:* **1. Visibility meters.**—*C.E.P.B.*

8.8–166 551.508.94:551.594.12

Vittozzi, Pio, **L'effetto di parete nelle camere di ionizzazione.** [The wall effect on an ionization chamber.] *Geofisica Pura e Applicata*, Milan, 33:163–176, **1956.** 8 figs., 7 tables, 10 refs., 39 eqs. English and Italian summaries p. 163. Also in *Annali di Geofisica*, Rome, 9(2):195–199, April **1956.** 10 refs., 4 eqs. Italian and English summaries p. 198–199. **DLC**—Theoretical formulas for the calculation of the wall effect in the ionization chambers for the determination of radioactivity are deduced, taking into consideration both the cases of plane and of the cylindrical wall. The formulas obtained are applied to the calculation of the wall effect in the ionization chamber annexed to SCHMIDT's apparatus. Because of the smallness of the chamber with respect to α particle's range, the empirical formula of DUANE and the approximate formula of DEIJ are not applicable and we compare the results obtained making use of each of the three formulas. The extension of the method to the aim of obtaining an analytical relation enabling one to deduce the wall from the chamber's dimensions is indicated. *Subject Heading:* **1. Ionization chambers.**—*Author's abstract.*

8.8–167 551.508.95:546.17

Thomas, M. D.; MacLeod, J. A.; Robbins, R. C.; Goettelman, R. C.; Eldridge, R. C. (*all, Stanford Research Institute*) and Rogers, L. H. (*Air Pollution Foundation, L.A.*), **Automatic apparatus for determination of nitric oxide and nitrogen dioxide in the atmosphere.** *Analytical Chemistry*, Wash., D. C., 28(12):1810–1816, Dec. **1956.** 7 figs., 3 tables, 12 refs. **DLC**—Nitric oxide and nitrogen dioxide in the atmosphere can be determined continuously with automatic sampling and recording apparatus. Two special absorbers are employed for absorption of nitrogen dioxide in a modified Griess reagent followed by colorimetric recording. One absorber measured the nitrogen dioxide alone; the other measures nitrogen dioxide plus nitric oxide after the latter has been oxidized by ozone, permanganate, or chlorine dioxide. Concentration limits of the instrument range up to about 1 p.p.m., but they can be considerably extended or reduced. Standard error is about $\pm 5\%$. *Subject Headings:* **1. Air sampling instruments 2. Nitrogen compounds.**—*Authors' abstract.*

SYNOPTIC ANALYSIS AND FORECASTING

See also: **Forecasting and regulating thermal regime** (Berliand), 8.8–9; **Synoptic meteorology** (Krichak), 8.8–16; **Notes on atmos.** (Pogosian), 8.8–18; **Central Forecasting Inst.** (Kashin), 8.8–50; **Hist. of weather forecasting** (Sanson), 8.8–60; **Forecasting critical temp. of winter wheat** (Lichikaki), 8.8–88; **Potato blight forecasting** (Smith), 8.8–89; **Weather conditions, July and Aug., 1954/55, Brit. Isles** (Booth), 8.8–135; **Seasonal forecasting, Tohoku District** (Ando), 8.8–200; **Cyclone forecasting** (Antonov et al.), 8.8–206; **Upper air wind persistence, Singapore** (Peterson, Scott), 8.8–258.

8.8–168 551.509.313:551.515

Gates, W. Lawrence, **A dynamical model for large-scale tropospheric and stratospheric motions.** *Royal Meteorological Society, Quarterly Journal*, 83(356):141–160, April **1957.** 6 figs., table, 36 refs., 59 eqs. **DWB**—A physical model of the atmosphere is postulated in which both the troposphere and stratosphere are characterized by a uniform thermal wind and a constant static stability, and are separated by a tropopause across which these quantities are discontinuous. Assuming the tropopause to be quasi-isobaric, a simplified model for the mean velocity, temperature and vertical motion fields of both the troposphere and stratosphere, the velocity near the earth's surface, and both the horizontal and vertical motion at the tropopause is constructed. The model may be regarded alternatively as a four-parameter or four-level model, but it is felt to avoid the primary disadvantages of the exclusive use of either the parameterized or layered formulation. Analysis of the special case of an equivalent-barotropic stratosphere indicates the existence of systematic tropopause variations, with the vertical motion at this level generally in phase with that of the mid-troposphere, and with a system of opposing vertical motion higher in the stratosphere. These features are in general agreement with the results of observational and synoptic research, although the details of the role of the tropopause must await further calculations. The analysis of the stability of tropospheric perturbations in a baroclinic zonal current shows a stabilizing influence of the stratosphere on the initial amplification of the disturbances. The minimum vertical shears required for instability with a basic jet current of 40 m sec^{-1} are more than twice those required without a stratosphere, and are shown to lie between the mean summer and winter shears in the zone of maximum westerlies. *Subject Heading:* **1. Atmospheric models.**—*Author's abstract.*

8.8–169 551.509.317:551.557:623.454.8(265)

§Otsuka, R. and Shimada, K. (*Central Meteorological Observatory, Tokyo*), **On the upper currents in low latitudes of the northwestern Pacific Ocean at the beginning of March, 1954 (Meteorological investigation on the explosion at Bikini Island, Pt. 1).** *Meteorological Society of Japan, Journal*, Ser. 2, 32(7/8):225–239, July/Aug. **1954.** 14 figs. In English. **MH-BH**—Weather maps, time height sections for single stations and stream line charts were used to study the synoptic pattern during an H-bomb explosion. Unstable conditions were found in the pressure pattern. Upper currents were westerlies from 3–17 km and easterlies below and above this layer. Tropopause height about 16 km with maximum at 12–13°N. Maximum wind speed in the westerlies 115 mph and 65 mph at 25 km in the easterlies. *Subject Headings:* **1. Upper air winds 2. Hydrogen bomb tests 3. Pacific Ocean 4. Bikini Island.**—*A.A.*

8.8–170 551.509.318:551.515.1

§Aujeszky, László, **Vizsgálatok a magyarországi quasistationaer frontok (Vb helyzetek) szinoptikája köréből (elsö kozlemény).** [Synoptic studies of quasi-stationary fronts (Vb situations) in Hungary, Pt. 1.] *Beszámolók az 1955-ben végzett tudományos kutatásokról* (issued as *Hungary. Országos Meteorológiai Intézet, Hivatalos Kiadványai*, Vol. 20, pub. Budapest, **1955**). p. 230–238. Russian and German summaries p. 230–231. **DWB**—As a preliminary study to an analysis of Vb situations in Hungary a list of ten synoptic requirements of such situations is given and explained. Some of these requirements are: strongly developed meridional circulation; southwesterly steering current; juxtaposition of opposing air masses in the lower troposphere; lack of cold advection aloft; coincidence of the 5.4-day cycle of zonal cyclone migration and the 7.2-day cycle of Azores outbreaks. *Subject Headings:* **1. Cyclone analysis 2. Vb situations 3. Hungary.**—*G.T.*

8.8–171 551.509.32:551.524.37:551.571.3

Ichikawa, J., **Research on the forecasting of late frost, Pt. 2.** *Journal of Meteorological Research*, Tokyo, 8(1):25–31, March 1956. 3 figs., 7 tables, 7 refs., eq. In Japanese; English summary p. 25. **DWB, DLC** The relation between vapor pressure and frost formation is investigated and found to lack significance in many cases. *Subject Headings:* **1. Frost forecasting 2. Vapor pressure effects.**—*From author's abstract.*

8.8–172 551.509.34(02)

Ramage, C. S. (*ed.*), **Hong Kong forecasters' manual.** *Hong Kong. Royal Observatory, Technical Note*, No. 10, Sept. 1955. each section renumbered. figs. **DWB** A collection of notes on local forecast problems and methods found to be useful in forecasting for the Far East. Includes analysis in the cool and warm seasons, streamline analyses, contour and time section analysis, tephigram analysis (not found to be useful in Hong Kong area thunderstorm forecasting), thickness pattern analysis (treated in detail with examples), use of SUTCLIFFE's development theory in construction of prebaritic charts, general and local forecasting hints (surface charts, persistence forecasting, local effects on winds, monsoons, ceiling, visibility and fog, precipitation, temperature and wording of forecasts), seasonal distribution of synoptic situations, a 3-dimensional precipitation classification, tropical trough and ridge movements, local typhoon forecasting and finally a schematic seasonal and monthly synoptic calendar. *Subject Headings:* **1. Local forecast manuals 2. Hong Kong 3. Far East.** —*M.R.*

8.8–173 551.509.5:551.515.2

U. S. Weather Bureau, **Toward improved hurricane warnings.** pub. by U. S. W. B., [1956?] unpaged. numerous figs. **DWB** An unusually well prepared and graphic portrayal of the problems confronted by the Weather Bureau in providing an adequate hurricane warning service, and steps which were taken in the fiscal year 1956, with the additional funds provided by Congress, to remedy these deficiencies or to solve the problems. Erratic movement, sparse reporting network at sea, incomplete radar coverage, insufficient wind, pressure and tide data along coastal areas, inadequate teletype service, shortage of staff at W. B. stations, especially at night, or during times when weather maps were being prepared, jammed telephone lines preventing intercommunications, lack of briefing facilities at busy centers, broken communication lines during storms or flash floods, lack of specialized local river forecasting techniques and personnel, need for studies of previous storms and floods and improper interpretation of known facts or forecasts are among the problems treated. *Subject Headings:* **1. Hurricane warning improvement 2. Hurricane warning networks 3. United States.** —*M.R.*

8.8–174 551.509.532:061

Wegeleben, Rolf, **Einrichtung eines besonderen Frostwarndienstes.** [Establishment of a special frost warning service.] *Germany. Deutscher Wetterdienst, Mitteilungen*, 3(16):13–15, 1956. **DWB** The organization, duties and operation of a frost warning service within the agrometeorological service of the West German weather service is discussed. The issuance of suitable weather forecasts and frost warnings specifically relevant to agricultural needs, providing special advice, distribution of maximum and minimum thermometers in areas to be protected against frost, participation in frost protection activities, etc. are some of the duties of the frost warning service. *Subject Headings:* **1. Frost warning services 2. West Germany.** —*I.L.D.*

ARTIFICIAL PRECIPITATION AND WEATHER CONTROL

See also: **Agric. implications of weather control** (Pavelis), 8.8–21.

8.8–175 551.509.6:351(795)

Oregon. Legislative Assembly. Interim Committee on Weather Control, **Weather modification: report.** (Salem), Jan. 7, 1953. 24 p. refs. **DLC, DWB** A thorough study of weather modification possibilities (by E. M. NELSON) and developments (by JOHN DAY), legal aspects and an appraisal of actual results in cloud seeding, followed by recommendation for further study (by R. T. BEAUMONT) and a draft of a bill for regulating weather modification

and control activities in Oregon. The law sets up a Weather Modification Board consisting of the State Engineer, the Director of Agriculture, a member of the Oregon State College Faculty to be appointed by the College president and 2 members to be appointed by the Governor; terms of office to be 4 years. *Subject Headings:* **1. Weather modification reports 2. Cloud seeding laws 3. Oregon. I. Nelson, E. M. II. Day, John III. Beaumont, R. T.** *M.R.*

8.8–176 551.509.62:634:061

*Johnson, Warren O. and Russell, Donald C., (*comps.*), **The season's report of the Federal-State Frost Warning Service, 1955/1956.** May **1956.** Each section repaged. At head of each District Report: **Report on Horticultural Protection Work.** almost entirely tables. **DWB**—A most detailed report on the weather during the 1955–56 frost season in Florida, the field studies and experimental projects by the frost forecast personnel, the distribution of forecasts, and separate reports for each of the 10 different forecast districts by the 8 local forecasters. Temperature data from >400 temperature stations in fields and groves are analyzed. Maps show exact locations of stations in each district. Comparative data are given for previous years in many cases. *Subject Headings:* **1. Fruit-Frost Services 2. Fruit frost forecasting 3. Florida. I. Federal-State Frost Warning Service, Lakeland, Florida II. U. S. Weather Bureau III. Florida. Agricultural Experiment Stations.**—*M.R.*

8.8–177 551.509.65

Dufour, L., **Kan men de mist kunstmatig doen verdwijnen?** [Can fog be dispersed artificially?] *Hemel en Dampkring,* The Hague, 53(7):132–135, July **1955.** 16 refs. **DWB, DLC**—The scientifically based methods for dispersing natural and artificial fog are classified and described, and their effectiveness is evaluated. These methods comprise the dispersal of mist by evaporation caused by warming and by reduction of water vapor; dispersal by ionization of the air containing fog droplets, and dispersal by means of precipitation. *Subject Headings:* **1. Artificial fog dissipation 2. Fog.**—*I.L.D.*

8.8–178 551.509.67:551.574.2:629.135

Warner, J. and Twomey, S. (*Div. of Radiophysics, C.S.I.R.O., Australia*), **The use of silver iodide for seeding individual clouds.** *Tellus,* Stockholm, 8(4):453–459, Nov. **1956.** 3 figs., table, ref. **DLC**—The results of seeding thirty-five supercooled clouds, mostly cumuliform, in southeastern New South Wales, 100 mi inland, are described. The silver iodide was released as a smoke from aircraft flying through the upper levels of the cloud or just below cloud base. It is concluded that silver iodide is an effective agent in inducing precipitation in clouds whose upper levels are at temperatures colder than −5°C. and that the precipitation is usually released 20 to 25 min after seeding in the case of cumulus clouds but later in the case of layer clouds. *Subject Headings:* **1. Cloud seeding effectiveness 2. Silver iodide from aircraft 3. New South Wales, Australia.**—*Authors' abstract.*

STRUCTURE AND PHYSICS OF THE ATMOSPHERE

COMPOSITION OF THE ATMOSPHERE

See also: **Atomic explosion effects on atmos.** (Smirnov), 8.8–112; **Ozone measurement** (Rasool, Vassy), 8.8–122.

8.8–179 551.510.41:551.508.952:551.507.352

Brewer, A. W., **Ozone-concentration measurements from an aircraft in N. Norway.** *Royal Meteorological Society, Quarterly Journal,* 83(356):266–268, April **1957.** 4 figs., ref. **DWB**—An ozone sampler, thermometer and dew point hygrometer were carried to 40,000 ft on 4 ascents (June 24–July 12, 1955) near Tromsö. Ozone concentration increased at the tropopause. *Subject Headings:* **1. Vertical ozone distribution 2. Norway.**—*C.E.P.B.*

ATMOSPHERIC POLLUTION

See also: **Atmos. pollution control study** (Air Pollution Foundation), 8.8–19; **Aerobiol. symposia** (Hyde), 8.8–55; **Smoke abatement** (Davidson), 8.8–92; **Smoke abatement and public health** (Wormsley), 8.8–93; **Atmospheric pollution effects,** 8.8–95; **Atomic explosion products** (Greenfield), 8.8–102; **Airborne measurement of atomic debris** (Machta et al.), 8.8–105; **Radioactive fallout,** 8.8–113.

8.8–180 551.510.42:551.551:551.558

Spurr, G. and Priestley, C. H. B., **The bent-over plume of hot gas.** *Royal Meteorologic Society, Quarterly Journal,* 83(356):269–270, April **1957.** 3 eqs. **DWB**—Spurr gives method of applying Priestley's formula (R.M.S., Q.J., 82(352):165–176, April 1956; s 7.9–130, Sept. 1956, *MAB*) to calculate theoretical plume rise from a chimney stack. Pries ley agrees. *Subject Heading:* **1. Smoke plumes.**—*C.E.P.B.*

UPPER ATMOSPHERE—IONOSPHERE

See also: **Solar eclipses and ionosphere,** 8.8–5; **Ozone changes, Edmonton** (Gowan et al.), 8.8–20; **Atmos. disturbances, Kerguelen and Heard Is.** (Luchet), 8.8–47; **Ionosphere bibliog.** (Manning), 8.8–70; **Stratospheric radiation calculation** (Curtis, Goody), 8.8-216; **Upper air cooling** (Lowan), 8.8–234; **Electron density in F2 layer** (Mariani), 8.8–308.

8.8–181 551.510.5

Béll, Béla, **A troposzféra rétegezettsége.** [Stratification of the troposphere.] *Besz molók az 1955-ben végzett tudományos kutatásokról* (issued as *Hungary. Országos Meteorológi Intézet, Hivatalos Kiadvanyai,* Vol. 20, pub. Budapest, **1955**). p. 250–259. 8 figs., tabl 9 refs. Russian and German summaries p. 250–251. **DWB**—Discusses tropospheric stratific tion as shown by the vertical distribution of temperature, relative humidity and wind. Th graphs presented show modification of the radiational layer during a cold front passage (Bud pest, Aug. 14–20, 1954); vertical distribution of temperature gradient over Budapest (195(1953) up to 10 km; vertical distribution of yearly amplitude of temperature variation at 3 a.r and 7 a.m.; vertical distribution of relative humidity over Budapest up to 5 km (June 1953 wind velocity distribution up to 15 km in winter and summer (1950–1953) and vertical di tribution of differences between morning and noon-time wind speed. *Subject Heading* **1. Tropospheric structure 2. Profiles of meteorological elements 3. Budapest, Hungar** —*G.T.*

8.8–182 551.510.53

Dütsch, H. U., **A daily variation of the total amount of ozone.** *I.U.G.G. Association Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 15(162. 2 figs., 2 tables, 4 refs. **DWB**—The daily variation of the total ozone amount as cause by photochemical action is determined by computing the number of quanta absorbed by oxyge and ozone for differing solar elevations occurring during the day. The computations showi the daily variation of ozone in the atmosphere for a constant daily temperature and for dai variation in temperature and for photochemical equilibrium at least in layers above 25 k are presented. The results of calculations of hourly mean in ozone variations based upo Arosa data are discussed with reference to daily variation in ozone amount during differe seasons. *Subject Heading:* **1. Ozone variations.**—*I.L.D.*

8.8–183 535.33:621.396.029.6:551.510.534:0

†Duke University. Dept. of Physics, **Microwave research.** Contract AF 19(604)-25 Quarterly Progress Report, Oct. 1, 1952–Jan. 31, **1953.** 9 leaves, 3+11 p. Bibliog. (titles) of publications done under the contract, leaves 4–8. Included: King, William C. a Gordy, Walter, **One to two millimeter wave spectroscopy, Pt. I.** 3 p. table, 3 refs. Tra barulo, R.; Ghosh, S. N.; Burrus, C. A., Jr. and Gordy, Walter, **Molecular structure, dipo moment, and g-factor of ozone from its microwave spectrum.** 11 p. 2 tables, 3 figs., 17 re **DWB**—Report contains a list of 60 papers published by members of the staff (under contract

abstracts of current projects on ozone, oxygen, millimeter wave measurements and microwave spectrometer studies. The two major papers cover measurement of spectral lines between 1.37 and 2.3 mm (220 to 130 KMc) in gap between optical and radio waves. The second paper covers recent work on the ozone spectrum. *Subject Headings:* **1. Microwave spectroscopy 2. Ozone spectra 3. Bibliography on microwave spectroscopy.**—*M.R.*

8.8–184 551.510.534

Fournier d'Albe, E. M., **Some observations on nocturnal ozone.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 149–158. 2 tables, 3 refs., 12 eqs. **DWB**—The rate of increase of ozone at night was studied at Quetta. Observations were made during the First Quarter of the moon for the sunset and during the Last Quarter for sunrise; so that the μ-values were low and almost stationary. A detailed account of the observations made in Nov., Dec. 1953 and May 1954 of the determinations of the ozone amount and the physical and chemical process involved in the ozone layer is presented. It is concluded that the apparent increase in ozone amount after sunset is real and that it occurs between the 40 and 60 km levels. *Subject Headings:* **1. Ozone variations at night 2. Quetta, Pakistan.**—*I.L.D.*

8.8–185 551.510.534

Martin, David W., **Contributions to the study of atmospheric ozone.** Massachusetts. Institute of Technology. Dept. of Meteorology, Contract AF 19(604)-1000, Scientific Report No. 6, Sept. 15, **1956.** 52 p. 4 tables, 51 refs., eqs. **DWB**—Hitherto photochemical theories have failed to account for the observed variations of ozone over the globe, and it is generally accepted that a comprehensive theory of these variations must rely on a discussion of dynamic processes in the atmosphere. Following a summary of observational data, these dynamic processes are analyzed here in two ways: firstly by the synoptic study of recent upper air data, information is obtained on the mechanisms of the day to day ozone changes; and secondly a statistical examination is made of the same basic data to indicate how the movements of the atmosphere may transport ozone on a very large scale, and so cause the seasonal and global distributions. *Subject Heading:* **1. Ozone variations.**—*Author's abstract.*

8.8–186 551.510.534:551.558.29

Martin, D. W. and Brewer, A. W., **Some synoptic aspects of the European results.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 177–180. fig., table. **DWB**—In view of the fact that the ozone is substantially always above 50,000 ft and the movements causing the ozone changes occur higher up, the use of 100 mb contour charts is suggested to study the relation between vertical movements and the total ozone by analyzing 24-hr trajectories and calculating vertical movements on the assumption of adiabatic motion. This approach was utilized in a study of the period Dec. 11–19, 1952 for N.W. Europe when the ozone amount over the British Isles made a double fluctuation. In the absence of definite trajectories, statistical methods were employed to obtain the interactions of the various variables at 100 mb. Confirmed NORMAND's finding that the relation between weather variation and total ozone become closer and more certain if the ozone is related to the contour pattern at 300 mb. MEETHAM's results based upon meteorological soundings were not confirmed. Evidence is provided of a connection between the dynamical processes recurring along a 24-hr trajectory and the 24-hr change of ozone, stratospheric temperature and vorticity at the end. *Subject Headings:* **1. Ozone variations 2. Vertical motion.**—*I.L.D.*

8.8–187 551.510.534:551.521.63

Walton, G. F., **The relation between an umkehr curve and the vertical distribution of atmospheric ozone.** *Royal Meteorological Society, Quarterly Journal,* 83(356):173–180, April **1957.** 2 figs., 2 tables, 13 refs., 22 eqs. **DWB**—An expression is derived for the intensity-ratio for two wavelengths in the ultraviolet of primary scattered sunlight received from the zenith at the base of a plane-stratified atmosphere. The logarithm of the intensity-ratio is expanded in a series which reveals the nature of the relation between it and the vertical distribution of atmospheric ozone. The information on the vertical distribution given by zenith observations

when the sun is high in the sky is discussed. *Subject Headings:* **1. Vertical ozone distribution 2. Ultraviolet solar radiation.**—*Author's abstract.*

8.8–188 551.510.535:523.74

Chvojková, Eliška, **Methoda ionosferických prognos.** [A method of ionospheric forecasting.] *Československá Akademie Věd, Prague, Rozpravy,* 65(11):**1955.** 54 p. 6 figs., 7 tables, 13 refs. Russian and German summaries p. 43–54. **DLC**—A method is developed for expressing changes in the diurnal variation of critical frequency for the F2 region as a function of solar activity. The method provides a graphical means of constructing diurnal curves of critical frequency for the F and E regions for a given future month, given geographic location and assumed solar activity. From these curves the highest and lowest frequencies which can be used between two points are determined by means of a nomogram. *Subject Headings:* **1. Diurnal ionospheric variations 2. Solar activity.**—*G.T.*

8.8–189 551.510.535:551.593.12:621.396.8:550.386

Dagg, M., **The correlation of radio-star-scintillation phenomena with geomagnetic disturbances and the mechanism of motion of the ionospheric irregularities in the F region.** *Journal of Atmospheric and Terrestrial Physics,* 10(4):194–203, **1957.** 9 figs., 13 refs. **DWB**—F-region drift velocities measured by scintillations of radio source in Cassiopeia at Jodrell Bank showed marked correlation with *K*-indices (mean of Eskdalemuir and Lerwick). Rapid changes of fluctuation, compared with magnetograms, showed close correlation of rate with *V*, and on some occasions of amplitude with *H*. Results support MARTYN's theory that observed drifts in F-region are not air motions but are due to interaction of earth's magnetic field with an electric field from lower levels. *Subject Headings:* **1. Radio star scintillation 2. Ionospheric drift 3. Geomagnetic fluctuations.**—*C.E.P.B.*

8.8–190 551.510.535:551.593.12:621.396.8:550.386

Dagg, M., **Diurnal variations of radio-star scintillations, spread F, and geomagnetic activity.** *Journal of Atmospheric and Terrestrial Physics,* 10(4):204–214, **1957.** 7 figs., 11 refs. **DWB**—Aerial at Jodrell Bank directed at Cassiopeia, and receiver, are described and scintillation records shown. Monthly and average diurnal variations of scintillation occurrence and amplitude, occurrence of spread-F at Inverness, and summation of magnetic K indices, are shown for Aug. 1954–July 1955. Maximum scintillation occurs about 2130, several hours earlier than spread-F maximum. A marked correlation is found between scintillation-rate amplitude and geomagnetic activity. *Subject Headings:* **1. Radio star scintillation 2. Spread F variations 3. Geomagnetic fluctuations.** *C.E.P.B.*

8.8–191 551.510.535

Gassmann, George J. (*A. F. Cambridge Res. Center, Bedford, Mass.*), **Airborne ionospheric measurements in the North Pole area.** *Journal of Geophysical Research,* Wash., D. C., 61(1):136–138, March **1956.** 2 figs. **DLC**—Ionospheric equipment was installed on a Boeing C-97 strato-cruiser and flown several times during 1954 and 1955 to the North Pole where a number of drift measurements were made while the airplane circled in 4-min turns. Drifts of 41 m/sec toward 290° and 33 m/sec toward 270° were observed on 2 occasions. Ion densities were no different than those at Pt. Barrow, Baker Lake and Resolute, even during a period of low sunspot activity in Jan. Vertical reflections, the z-component and plans for future (correlation with aurora and geomagnetic dip, etc.) are discussed. *Subject Headings:* **1. Air-borne ionospheric measurements 2. Ionospheric records at North Pole 3. North Pole.**—*M.R.*

8.8–192 551.510.535

Lepechinsky, D., **The Q.L.-Q.T. transition level.** *Journal of Atmospheric and Terrestrial Physics,* 10(4):243–244, **1957.** fig., ref. **DWB**—Discussion of a comment by C. O. HINES on LEPECHINSKY's paper in *Ibid.,* 8(6):297–304, June 1956 (*see* 7.11–161, Nov. 1956, *MAB*). *Subject Heading:* **1. Ionosphere research.**

8.8–193 551.510.535:551.590.24

Minnis, C. M., **Ionospheric changes at Singapore during the solar eclipse of 20 June 1955.** *Journal of Atmospheric and Terrestrial Physics*, 10(4):229–236, **1957.** 5 figs., 2 tables, 11 refs., eq. **DWB**—Measurements were made, at vertical incidence, of the changes in the ionosphere which accompanied the eclipse. It has been possible to derive the distribution and intensities of the solar sources of ionizing radiation responsible for the E layer during the eclipse. Although it would not have been obscured at Singapore, it has been necessary to postulate the existence of a bright source in the sun's Southern Hemisphere having an intensity equal to 21% of the total radiation. This figure agrees well with the intensity (23%) derived from measurements made on the control days, of a source of radiation associated with an active group of spots which was in the Southwest quadrant on 20 June. No significant change occurred in the F2-layer critical frequency during the eclipse, but the temporary appearance of an F1½ layer, in addition to the usual permanent ledge in the F2 layer, indicates that the eclipse was responsible for a rearrangement of the electron distribution in the lower part of the F2 layer. *Subject Headings:* **1. Solar eclipse effects on ionosphere 2. Singapore.**—*Author's abstract.*

8.8–194 551.510.535

†Oriol Cardus, J., **Sondeos ionosfericos.** [Ionospheric soundings.] *Revista de Geofisica*, Madrid, 14(56):285–312, Oct./Dec. **1955.** 8 figs., 19 refs., eqs. **DWB, DLC**—An ionospheric recording station was established at Ebro Observatory on March 26, 1955. The history of ionospheric soundings and propagation of electromagnetic waves from BALFOUR-STEWART (1878) and HEAVISIDE (1902), APPLETON (1927) and others is outlined, and the basic equations presented and one explained. Application of theory to ionospheric sounding (determination of height, electron density, magnetic field, etc.) is next reviewed. Notes on the equipment installed at Tortosa, photographs of installations and records made in 1955, and analysis of records made at Tortosa from May to Sept. 1955, showing mean hourly variations in E, F1 and F2 layers for each month together with conclusions as to diurnal, seasonal, and regional variations in height, etc. of the various layers, are presented. *Subject Headings:* **1. Ionospheric sounding stations 2. Ionospheric research 3. Ebro Observatory, Spain 4. Tortosa, Spain.**—*M.R.*

8.8–195 538.56:537.56:551.510.535

Poincelot, Paul, **Réflexion d'une onde électromagnétique plane sur un milieu ionisé.** [Reflection of a plane electromagnetic wave from an ionized medium.] *Académie des Sciences, Paris, Comptes Rendus*, 241(2):186–188, July 11, **1955.** 2 refs., 15 eqs. Also his: **Réflexion d'une onde électromagnétique plane sur un gaz ionisé suivant une certaine loi.** [Reflection of a plane electromagnetic wave from an ionized gas according to a given law.] *Ibid.*, 241(3): 290–292, July 18, **1955.** 14 eqs. Also his: **Réflexion d'une onde électromagnétique plane sur un gas ionisé.** [Reflection of a plane electromagnetic wave from an ionized gas.] *Ibid.*, 241(9):649–651, Aug. 29, **1955.** ref., eqs. **DLC**—Reflection of plane electromagnetic waves is treated mathematically, considering pulse frequency and structure of the reflecting ionized medium (electronic density, height, etc.). The analysis involves Hankel functions and their asymptotic developments. *Subject Headings:* **1. Electromagnetic wave reflection 2. Ionized media.**—*G.T.*

MECHANICS AND THERMODYNAMICS OF THE ATMOSPHERE

See also: **Atmos. diffusion applied to atomic fallout** (Marciano), 8.8–107.

8.8–196 551.511.1:551.513.1:551.557

Spar, Jerome, **A note on the stability of baroclinic waves.** *Journal of Meteorology*, 14(2): 136–140, April **1957.** 3 figs., table, 5 refs., 27 eqs. **DWB**—The stability characteristics of waves in a thermotropic atmosphere are computed for several velocity profiles. It is shown that the critical wavelength for any wind shear varies considerably with the shape of the velocity profile. *Subject Headings:* **1. Baroclinic wave stability 2. Wind profiles.**—*Author's abstract.*

8.8–197 551.51

Watanabe, T., **Normal fields of divergence and convergence of the integrated atmosphe over Japan.** *Journal of Meteorological Research*, Tokyo, 8(3):123–129, March **1956.** 14 fig table, 8 refs., eqs. In Japanese; English summary p. 123. **DWB, DLC**—Making use o simple relation derived in a previous paper, expressing the divergence and converge of the integrated atmosphere as a function of the 500 mb height and surface pressure, fields divergence and convergence are constructed on a normal weather chart over Japan in wint This computation of divergence is performed by a graphical method. A comparison of the fields of small scale divergence and convergence over Japan with the fields of large scale vergence and convergence of the integrated atmosphere for the Northern Hemisphere indica the small scale pattern of divergence to be more characteristic of the climatological conditio over Japan. The dynamical mechanism of divergence and convergence caused by topograp is also examined. *Subject Headings:* **1. Convergence and divergence 2. Japan.**—*Autho abstract.*

8.8–198 551.511.33:551.509.3

§Moene, Asmunn, **Potential energy and departure from the state of equilibrium of t free atmosphere.** *Meteorologiske Annaler*, Oslo, 3(15):425–458, **1954.** 19 fig., 3 refs., 47 e **DLC**—A new definition of the potential energy of the free atmosphere is proposed and pre ously used approaches are critically analyzed. The discussion leads to a practical applicati the relation

$$\mathbf{v}_h' = \frac{1}{2\Omega_z}\mathbf{K}(\nabla_p\varphi - R\nabla_p\varphi) > 0$$

$\mathbf{v}_h'$—change in velocity vector within a given pressure surface; Ω_z—angular velocity of t earth; $\mathbf{K}$—vertical unit vector; ∇_p—derivatives (del-operator) by constant pressure; φ geopotential; θ—absolute temperature. Practical cases with minor or major developme are shown. The energy dissipation has to be computed with an empirical adjustment. *Subj Headings:* **1. Potential energy 2. Numerical forecasting 3. Europe.**—*A.A.*

8.8–199 551.51

Ogura, Y., **The influence of finite observation intervals on the measurement of turbule diffusion parameters.** *Journal of Meteorology*, 14(2):176–181, April **1957.** 15 refs., 39 e **DWB**—The correlation functions obtained from truncated samples are expressed in terms the sampling length and the correlation functions of the basic stationary random variabl The application of the results to diffusion phenomena in a turbulent flow is discussed. T investigation brings out the influence of confining oneself to finite observation intervals on t average rate of dispersion of particles from a point source. It is also shown that the turbule level is of importance in determining the relationship between the Eulerian and Lagrangi time intervals of observation. *Subject Heading:* **1. Statistical theory of turbulence.**—*Autho abstract.*

GENERAL CIRCULATION

See also: **Fluid models in geophysics** (U. S. Off. of Naval Res.), 8.8–6; **General circulation** (Van Mieghem), 8.8–31; **Arctic jet stream** (Lee, Godson), 8.8–45; **Baroclinic wave stability** (Spar), 8.8–196; **Atmos. circulation experiment** (Riehl, Fultz), 8.8–259.

8.8–200 551.513.7:551.509.

Ando, M., **Study of seasonal forecasting with reference to the Tohoku District (T general circulation observed from the variations of the mass of air over the Northern Hem sphere, Pt. 1).** *Journal of Meteorological Research*, Tokyo, 7(12):755–764, Jan. **1956.** 8 fig 24 refs., 3 eqs. In Japanese; English summary p. 755. **DWB, DLC**—Seasonal variatio of the mass of air over the whole Northern Hemisphere and above each latitude band shown for the periods 1929–1938 and 1951–1954. It is found that over high-latitude ban the mass of air is maximum in spring and minimum in autumn, while over other latitude ban the maximum appears in winter and the minimum in summer. The large transfer of mass of air from middle latitudes to high ones takes about two months; it often brings cold weath to Japan. In the autumn preceding a cool summer in the Tohoku District a large trans

of air from middle to high latitudes is apt to occur. *Subject Headings:* **1. Seasonal forecasting 2. Atmospheric circulation anomalies 3. Japan.**—*From author's abstract.*

8.8–201 551.513:551.583.1(52)

§Yakuwa, Risuke, **Climatic conditions and the atmospheric circulation over the region of northern Japan.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 277–288. 8 figs., table. **DWB**—In this study of the influence of the atmospheric circulation upon the climate of northern Japan, the author analyzes the secular variation of the mean air temperature of July–Aug., the characteristics of abnormally cool summers and the circulation conditions responsible for cool bad summers. Numerous synoptic maps are included. *Subject Headings:* **1. Atmospheric circulation 2. Climatic variations 3. Japan.**—*I.L.D.*

8.8–202 551.513.1(261)

Flohn, H., **Investigations on the general atmospheric circulation, especially in lower latitudes.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 431–442. 8 figs., 4 tables, 20 refs. **DWB**—The author discusses the dynamic factors producing the difference in stability of trade winds and monsoons on the basis of analysis of the precipitation and wind relationships in the equatorial Atlantic. The inter-hemispheric flux of mass, momentum and heat is examined, and a revised model of the mean meridional circulation of the atmosphere is presented. *Subject Headings:* **1. Atmospheric circulation 2. Equatorial Atlantic.**—*I.L.D.*

8.8–203 551.513.2:551.557(6, 262)

§Lamb, H. H.; Fleming, J.; Hoyle, H. D. and Robinson, J., **Jet streams over North Africa and the central Mediterranean in January and February, 1954.** *Meteorological Magazine,* London, 86(1018):97–111, April **1957.** 6 figs., 5 tables, 5 refs. **DWB**—Several times in winter 1953/4 Africa north of 20–25°N and much of Mediterranean was covered by a very broad intense belt of high level winds. Jan. 1–10, 1954, is analyzed; axis was close to Wheelus Field (151 kn at 300 mb, Jan. 2–8) and Benina (154.5 kn at 200 mb), maximum speeds about 200 kn. Sea level and 300 mb synoptic charts, time cross section at Malta and vertical cross sections are shown. Other polar jets about 350 mb moved down from the north and coalesced with the main jet. Violent turbulence on the north flank and anticyclonic shear on the right are described. *Subject Headings:* **1. Jet stream analysis 2. North Africa 3. Mediterranean.**—*C.E.P.B.*

8.8–204 551.513.2:551.557:629.13

Roche, Robert Daniel (*Meteorologist, Lockheed Aircraft Corp., Georgia Div.*), **The jet stream: sky-high overdrive.** For presentation at the SAE [Society of Automotive Engineers] Meeting, New York, April 18–21, **1955.** 5 p. 11 figs. **DWB** (M57.2 R673j)—A concise review of the discovery, character and use made of the jet stream (especially in trans-Pacific flying) is followed by a number of charts (some schematic) showing nature and geographical location of jet stream on a hemispheric scale. *Subject Headings:* **1. Jet stream 2. Trans-Pacific flying.**—*M.R.*

ATMOSPHERIC DISTURBANCES

See also: **World distribution of thunderstorms** (WMO), 8.8–27; **Tropical cyclone dynamics** (Palmén, Riehl), 8.8–29; **Storm surge, Lake Michigan** (Ewing et al), 8.8–75; **Storm surges, N. Sea** (Weenink), 8.8–78; **Radar hail warnings** (Roncali), 8.8–127; **Radar thunderstorm obs.** (Mitra), 8.8–128; **Anticyclogenesis** (Miles), 8.8–137; **Large scale tropospheric and stratospheric motions** (Gates), 8.8–168; **Synoptic studies of Vb situations, Hungary** (Aujeszky), 8.8–170; **Hurricane warning improvement** (U. S. W. B.), 8.8–173; **Heat waves, Egypt** (Soliman), 8.8–229; **Pressure fluctuation** (Lynch), 8.8–237; **High pressure belt, Australia** (Das), 8.8–241; **Funnel cloud, Ramsgate** (Nicholas), 8.8–268; **Thunderstorms as noise radiators** (Chandrasekhar Aiya et al.), 8.8–316.

8.8–205 551.515:551.543:551.46:532.59

Greenspan, H. P., **The generation of edge waves by moving pressure distributions.** *Journal of Fluid Mechanics,* 1(6):574–592, Dec. **1956.** 8 figs., 2 tables, 6 refs., 58 eqs. **DLC**—

An analytical study is made of the resurgent wave motion induced by pressure distribution moving parallel to a straight coast line. The resurgence is shown to consist of an infinit number of edge wave modes; expressions for these modes are given and the wave lengths frequencies and amplitudes are shown to be in agreement with experimental results. Th effects of a Gaussian pressure distribution are analyzed. For large-scale disturbances off th east coast of the United States only the fundamental mode is excited. Conditions, such a storm size, speed and distance from shore, for maximum induced wave amplitudes are derived *Subject Headings:* **1. Pressure effects on waves 2. Wave mechanics.**—*Author's abstract.*

8.8–206 551.515.1:551.509.311(47)

Antonov, V. S.; Baranov, N. P. and Makhover, Z. M., **Nekotorye resul'taty primeneniia polozhenii K. I. Kashina i M. V. Gritsenko k prognozu vykhoda kaspiiskikh's tsiklonov.** [Some results of the application of Kashin and Gritsenko's theses to the forecasting of the appearance of Caspian cyclones.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:34–35, Nov./Dec. **1955**. 2 figs., 2 refs. **DWB, DLC**—The theses of KASHIN and GRITSENKO are that a close connection exists between tongues of warm and cold air at the 500 mb level and the development and movement of cyclones. (*See* Kashin, K. I. and Gritsenko, M. V., **Ob izmenenii davleniia u zemnoĭ poverkhnosti.** [Surface pressure changes.] *Ibid.*, No. 5, **1954.** Review by N. N. Romanov, *Ibid.*, No. 6:59–60, Nov./Dec. **1955.** See also their: **K voprosu o peremeshcheniĭ tsiklonov i antitsiklonov.** [Displacement of cyclones and anticyclones.] *Ibid.*, No. 6, **1954.** (*Note: neither No. 5 nor No. 6, 1954 available at DLC or DWB*). An analysis of aerological data of 32 Caspian cyclones (issuing from the Northern Caucasus, Caspian Region and the Central and Lower Povol'zhe) showed that 30 Caspian cyclones were parallel to the axis of warm air at 500 mb at the vertex of the tongue. An example of anomalous movement of a cyclone is discussed. *Subject Headings:* **1. Cyclone development 2. Cyclone forecasting 3. Russia.**—*I.L.D.*

8.8–207 551.515.1(261.2)

Bijvoet, H. C., **On the causes of the severe north-westerly gale in the North Sea on Jan. 31–Feb. 1, 1953.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings*, London, Butterworth, **1956.** p. 27–30. fig., 4 eqs. **DWB**—It has been shown that the development of the storms followed a normal course, in other words, the depression was characterized merely by a greater intensity of development. The cause of such intensive development is analyzed by considering the changes of the vertical component of the relative vorticity of the geostrophic wind at the surface. It is shown that "a rapid development of strong pressure gradients at the rear of depressions can be expected when, in a certain stage during the development of a cyclone, the temperature field in the upper air satisfies" the exceptional temperature pattern characterized by "a tongue of cold air at the rear of the depression bent at the warm side parallel to the 1000 mb contour." *Subject Headings:* **1. Cyclone development 2. North Sea storm (1953) 3. North Sea.**—*I.L.D.*

8.8–208 551.515.1 551.543.2

Pícha, Jaroslav, **Tlakové anomalie severoatlantické deprese v letech 1906–1950.** [Pressure anomalies of North Atlantic depressions during the period 1906–1950.] *Meteorologické Zprávy*, Prague, 5(2):47–48, **1952.** 3 tables, 3 refs. Russian and German summaries p. 47. **DLC**—In a discussion between F. BAUR and M. RODEWALD on the development of cold winters in Central Europe, the latter pointed out that a very close correlation was found by A. PEPPLER between average pressure anomalies in spring and those in the last quarter of the year. It is shown here that PEPPLER's correlation has limited validity and is useless for long range forecasting. *Subject Headings:* **1. Pressure anomalies 2. North Atlantic.**—*Trans. of author's abstract.*

8.8–209 551.515.11:551.43

Berkes, Zoltán and Borsos, József, **A ciklonképződési helyek eloszlása az északi félgömbön.** [Distribution of locations of cyclogenesis over the Northern Hemisphere.] *Időjárás*, Budapest, 59(6):321–330, Nov./Dec. **1955.** 9 figs., 4 tables. Russian and English summaries p. 321. **DWB, DLC**—The paper presents an analysis of the geographical distribution of

cyclogenesis in the Northern Hemisphere, using the daily historical hemispherical charts of the years 1921–1930. It is found that maximum frequency of cyclogenesis occurs in the East China Sea, along the eastern side of the Rockies, on the east coast of North America, and in the Mediterranean near Genoa. On the other hand, cyclogenesis is rather exceptional in the vicinity of Iceland or the Aleutians. It is shown that orography plays an important part in cyclogenesis. *Subject Headings:* **1. Cyclogenesis distribution 2. Orographic effects on cyclogenesis.**—*Authors' abstract.*

8.8–210 551.515.11

Garriock, A. (*Central Met. Bureau, Melbourne*), **Cross section of Southern Ocean cyclone from observations at Kerguelen and Heard Islands.** *Australian Meteorological Magazine*, Melbourne, No. 10:71–74, Sept. **1955.** 3 figs., table. **DWB**—On the assumption that cyclone systems change little in structure over a period of about 16 hrs, a series of observations was made upon a summer apex warm sector cyclone which passed between Kerguelen and Heard Island. Diagrams of the plot of Heard lower level and Kerguelen upper level observations, as if the cyclone remained stationary and the observing points moved through the cyclone, a sounding through a warm front, and a hodograph of radio theodolite winds are presented. *Subject Headings:* **1. Cyclone structure 2. Southern Ocean cyclones.**—*I.L.D.*

8.8–211 551.515.2(267)

Desai, B. N. and Rao, Y. P., **On the formation and direction of movement of some recent severe cyclones in the Indian seas [summary].** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 335. **DWB**—The results of a survey of three severe cyclones in the Bay of Bengal and of one in the Arabian Sea in the post-monsoon season and of a severe cyclone in the Arabian Sea in the pre-monsoon season are presented. In all cases a low pressure wave moved into the Indian Seas from the east in low latitudes bringing in a surge of easterly to southeasterly Tm air to the north of the I.T.F. All the cyclones curved to northeast after the initial W. to N.W. movement except one Bay cyclone which did not change its direction of movement. *Subject Headings:* **1. Tropical cyclone formation 2. Bay of Bengal 3. Arabian Sea.**—*I.L.D.*

8.8–212 551.515.2:551.551(54)

Koteswaram, P. and Gaspar, S. (*both, Regional Met. Center, Madras*), **The surface structure of tropical cyclones in the Indian area.** *Indian Journal of Meteorology and Geophysics*, Delhi, 7(4):339–352, Oct. **1956.** 12 figs., 3 tables, 14 refs., eqs. **DWB, DLC** –The chief feature of the paper is the study of the composite structure of the surface wind field in severe cyclonic storms in the Bay of Bengal and the Arabian Sea by analysis of ships' reports received from the storm field. The storm field has been divided into octants, with respect to the direction of movement of the storm and from available ships' reports in the fields of all severe cyclonic storms in the Indian Seas during the period 1925–54, the variation of total tangential and radial velocities with distance from center in each octant analyzed. From these, composite pictures giving the total, tangential and radial wind field have been constructed. The mean fields of incurvature, divergence and vorticity have been obtained from the above and discussed. Precipitation associated with the above wind field has also been computed. Rainfall associated with individual storms has also been analyzed and compared with computed values. In the initial paragraphs, the distribution of pressure in the storm field and near the center of storm has been analyzed and discussed. The distribution of free air temperature and sea surface temperature has also been studied for a few storms for which data were available. *Subject Headings:* **1. Wind structure 2. Tropical cyclones 3. Wind fields 4. Bay of Bengal 5. Arabian Sea.**—*Authors' abstract.*

8.8–213 551.515.2

Murakami, T., **On the birth place and recurving point of typhoons.** *Journal of Meteorological Research*, Tokyo, 5(7):609–612, Aug. **1953.** 3 figs., 5 tables. In Japanese; English summary p. 609. **MH-BH**—In this statistical analysis of various characteristics of typhoons during the period 1947–1951, tables and charts are presented on (1) places of origin, (2) fre-

quencies of origin by lat. and long., (3) relation between lat. of origin and deepest central pressure (4) seasonal variation of lat. of deepest center, (5) places of recurvature, (6) relation between lat. of origin and recurving point, (7) relation between lat. of origin and long. of recurving point and (8) monthly frequency of straight and recurved typhoons. *Subject Heading:* **1. Typhoon statistics.**—*G.T.*

8.8–214 551.515.3

Mercanton, Paul Louis, **Nouvelles observations de trombes sur le Lac Léman.** [New observations of water spouts on Lake Leman.] *Société Vaudoise des Sciences Naturelles, Lausanne, Bulletin,* 66(289):155–160, Sept. 15, **1955.** photos. **DWB**—Waterspouts have often been observed on Lake Léman—24 are listed from 1741 to 1954. A number of these have been described by the author in previous issues of this **Bulletin.** In this issue the last 5 (1948–54) are described; the last 2 on Aug. 7, 1954 observed from Lausanne described in detail and the last one shown in a photograph. *Subject Headings:* **1. Waterspouts on lakes 2. Lake Léman.**—*M.R.*

8.8–215 551.506.7:551.515.827

§Sawyer, J. S., **The free atmosphere in the vicinity of fronts: analysis of the observations by the Meteorological Research Flight, 1950–52.** *Great Britain. Meteorological Office, Geophysical Memoirs,* No. 96, **1955.** M. O. 584d. 24 p. 16 figs., 5 tables, 4 refs. **DWB**—Observations of temperature, humidity, cloud and turbulence were made on horizontal flights through 23 fronts at levels up to 20,000 ft and cross-sections constructed. There were great differences in detail; the best defined frontal zones were at high levels in cold fronts. Histograms and profiles show widths of frontal zones and temperature contrast. Slope ranged from 1:250 to 1:30, average 1:56. Temperatures were irregular; S.D. of deviation from 5-min means is 0.5 in clear sky, 0.7 in cloud, 0.84 near cloud edge, all decreasing with height. All sections showed a tongue of dry air extending downwards parallel to front, probably advective. Cloud distribution varied widely; mainly in warm air and transition zone. Turbulence was not excessive; greatest near boundaries of cloud and precipitation. (*See also* 5.5–113, May 1954, *MAB.*) *Subject Heading:* **1. Frontal structure.**—*C.E.P.B.*

RADIATION AND TEMPERATURE

RADIATION

See also: **Forecasting and regulating thermal regime** (Berliand), 8.8–9; **Infrared radiation instruments** (Hilsum, Ross), 8.8–151; **Cosmic ray measurement** (Manning), 8.8–155; **Relationship between ultraviolet radiation and vertical ozone distribution** (Walton), 8.8–187; **Solar radiation variations** (Loewe), 8.8–240; **Variations in insolation** (Wexler), 8.8–292; **Solar neutrons** (Petukhov), 8.8–311.

8.8–216 551.521:551.501.4:551.510.53

Curtis, A. R. and Goody, R. M., **The effect of departures from Kirchhoff's law on stratospheric radiation calculations.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 569–570. 3 eqs. **DWB**—Because of decreasing collision frequency with height in the atmosphere, there is, for any given absorbing gas, a height above which collisions are too infrequent to maintain a Boltzmann distribution of energy among the vibrational states, in face of the de-exciting effect of spontaneous emission. Above this height Kirchhoff's law ceases to hold, and the equation of radiative transfer for a vibration band passes over into a scattering equation, giving zero net heating rate due to the band. *Subject Heading:* **1. Stratospheric radiation calculations.**—*Authors' abstract.*

8.8–217 551.521.1

Danilova, N. A., **Radiatsii v oktiabre.** [Radiation in October.] *Priroda,* Moscow, 45(10):126–127, Oct. **1956. DLC**—The author presents a qualitative description of the

distribution of solar radiation over the territory of the U.S.S.R., the radiation balance during Oct. and the resulting fall characteristics of this month. *Subject Headings:* **1. Solar radiation 2. Radiation balance 3. U.S.S.R.**—*I.L.D.*

8.8–218 551.521.1:697

Dirmhirn, I. (*Vienna*), **Himmelsstrahlung im Bauwesen.** [Sky radiation in building design.] *Wetter und Leben*, Vienna, 7(8/11):200–201, **1955.** fig., ref. **DLC**—The author represents graphically the daily totals of sun and sky radiation incident upon differently oriented walls of buildings on cloudless days and on moderately cloudy days for March, June, Sept. and Dec. in Vienna; the values are expressed in cal/cm². *Subject Headings:* **1. Solar radiation 2. Sky radiation 3. Radiation on variously oriented surfaces 4. Vienna.**—*I.L.D.*

8.8–219 551.521.1:595.7

Wellington, W. G. (*Forest Bio. Lab., Victoria, B. C.*), **Solar heat and plane polarized light versus the light compass reaction in the orientation of insects on the ground.** *Entomological Society of America, Columbus, Ohio, Annals*, 48(1/2), Jan./March **1955.** 6 figs. (incl. photo), 13 refs. **DLC**—Insects are found to orient themselves by solar heat when available, by polarized light or gradients of light intensity in overcast weather, and become confused when smoke layers or ice crystal clouds vary rapidly across the sun. A thorough study of the subject is reported in this paper. *Subject Headings:* **1. Insect navigation 2. Solar heat effects on insects 3. Polarized light orientation.**—*M.R.*

8.8–220 551.521.12(469)

*Oporto, Portugal. Universidade. Instituto Geofísico, **Anais actinométricos, 1954.** [Actinometric annual, 1954.] Pub. V.N. de Gaia, Portugal, **1955.** unpaged. 26 tables (fold.) **DWB**—This new publication is devoted entirely to actinometric data obtained at Serra do Pilar, Portugal Observatory, 41°8′N and 8°3′W, elev. 96.5 m, with four different types of actinometers (Gorczynski solarimeter, Moll-Gorczyński solarigraph, Abbot silver disk pyrheliometer, and Ångström pyrheliometer). The instruments are calibrated periodically. Tables 1–12 give hourly, daily and monthly global radiation in gr cal/cm²; Tables 13–22 give values of direct radiation in ly/min at different solar heights or times of day with four different filters and w/o filter using a Gorczyński pyrheliometer. Maximum daily values obtained with the same instrument and time theory, height of sun, occupy Tables 23–25 and air mass intensity data, Table 26. *Subject Headings:* **1. Actinometric bulletins 2. Annual actinometric data publication 3. Global radiation data 4. Serra do Pilar Observatory 5. Oporto, Portugal.** —*M.R.*

8.8–221 551.521.3:551.593.53

Möller, F., **Actinometric determination of atmospheric turbidity.** *I.U.G.G. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 526–532. 3 figs. **DWB**—The author discusses turbidity coefficient values as determined by Ångström and Linke, the explanations of the power law by Mie, Junge's direct determination of turbidity, the correlation between the aerosol spectrum of Junge and the power law, the effect of aerosol particles on extinction, the distribution of scattered light by the Mie theory, the three different types of scattered light distributions and the corresponding size distributions of the aerosol spectra, the relationship between scattering types and air mass of the observer and the polarization of the skylight. *Subject Heading:* **1. Turbidity factors.**—*I.L.D.*

8.8–222 551.521.61:551.508.822

Brewer, A. W.; Houghton, J. T. and Gergen, John L., **Experimental determination of atmospheric infra-red radiation.** *Nature*, London, 179(4567):978, May 11, **1957.** 3 refs. **DWB**—Brewer and Houghton criticize Gergen (*Nature*, 179(4549):36–37, Jan. 5, **1957**; *see* 8.6–226, June 1957, *MAB*) on the ground that his "black ball" indicates places where a black body (not the atmosphere) is being heated or cooled. Gergen states that an analysis of black-ball temperature differences will appear in Journal of Meteorology. *Subject Headings:* **1. Infrared radiation instruments 2. Radiosonde radiation instruments.**—*C.E.P.B.*

8.8–223 551.521.63:523.77:551.507

Jursa, A. S.; LeBlanc, F. J., and Tanaka, Y. (*all, U. S. A. F. Cambridge Res. Center, Air Res. and Dev. Command*), **Results of a recent attempt to record the solar spectrum in the region of 900–3000 A.** *Optical Society of America, Journal*, 45(12):1085–1086, Dec. **1955.** fig., 5 refs. **DWB, DLC**—Solar spectra in the 2000 A to 3000 A range obtained on rocket flights have been reported by Tousey and others in 1953 and 1954. This note gives results of an aerobee flight to 122 km on March 29, 1955 at Holloman Air Development Center, N. Mex., using a spectrograph with 40-cm, 15,000 lines per in. grating and normal incidence, designed for a range from 900–3000 A. One of 7 spectra thus obtained at 94–112 km, is reproduced. Lines between 2090 and 1548 A are weak and indistinct compared with those >2100 A. A H Lyman α line shows up at about 1200 A. No H Lyman β lines showed up, probably because of short exposure time. Broad absorption lines appear at 1848, 1851, 1932 and 1937 A. *Subject Headings:* **1. Solar spectra, 1200–2100 A. 2. Rocket spectrograph observations 3. Holloman Air Development Center, N. Mex.**—*M.R.*

8.8–224 551.521.64:537.591.15

Fowler, P. H.; Hillier, R. R. and Waddington, C. J., **Interactions of the heavy nuclei of the cosmic radiation.** *Philosophical Magazine*, 8 ser., 2(15):293–304, March **1957.** fig., 6 tables, 7 refs. **DWB**—We have observed in a systematic manner 317 nuclear interactions produced by the heavy nuclei of the primary cosmic radiation in nuclear emulsions. From a study of these interactions we have found the interaction mean free paths and fragmentation probabilities. The interaction mean free paths are in good agreement with those reported previously. The fragmentation probabilities, particularly those for the production of light nuclei, are considerably smaller than those currently accepted. In addition, from a study of the angular distribution of the nuclei emitted from the interactions we have shown that the energies of emission in the C-system of the incident nucleus are greater than those previously accepted and depend on the charge of the primary nucleus. *Subject Heading:* **1. Cosmic ray showers.**—*Authors' abstract.*

8.8–225 551.521.64:537.591.2

Fowler, P. H.; Waddington, C. J.; Freier, P. S.; Naugle, J. and Ney, E. P. **The low energy end of the cosmic ray spectrum of alpha-particles.** *Philosophical Magazine*, 8 ser., 2(14):157–175, Feb. **1957.** 8 figs., 3 tables, 16 refs., 3 eqs. **DWB**—An experiment has been carried out at Saskatoon, Canada, at a nominal geomagnetic lat. of 60.5°N, which shows the form of the low energy end of the cosmic ray alpha particle spectrum independent of the earth's magnetic field. The differential spectrum shows a maximum at about 300 Mev per nucleon. The number of particles on the low energy side of the maximum is too great to be accounted for by secondary production, and it is believed that this spectrum represents the differential spectrum of primary alpha particles outside the earth's magnetic field. A re-analysis of previous experiments at a lower geomagnetic lat., 55°N, in the American continent, gives a spectrum very similar to the one obtained in Saskatoon. As a consequence of this it appears that the cut-off energies experienced by cosmic ray particles over the American continent are probably lower than those predicted by geomagnetic theory. *Subject Heading:* **1. Cosmic ray spectrum.**—*Authors' abstract.*

8.8–226 551.521.64

Rothwell, P.; Wade, B. and Goodings, A., **Directional measurements on extensive air showers.** *Physical Society of London, Proceedings*, Sec. A, 69(12):902–909, Dec. 1, **1956.** 6 figs., 2 tables, 6 refs. **DWB**—Direction of arrival of cosmic ray showers, determined by 4 cloud chambers to a hundredth of a steradian, shows no sign of localized sources of primary rays. Average energy of showers observed was 8×10^{15} ev. *Subject Heading:* **1. Cosmic ray directional measurement.**—*C.E.P.B.*

8.8–227 551.521.64

Marsden, P. L. and Doran, G. A., **The nucleonic component in cosmic ray extensive air showers.** *Physical Society of London, Proceedings, Sec. A*, 69(12):894–901, Dec. 1, **1956.** 3 figs., 4 tables, 13 refs. **DWB**—The ratio β of the density of fast nucleons to that of electrons

in extensive showers has been measured within 20 meters of the shower axis, the nucleons being detected through the evaporation neutrons arising from the interactions of these particles. It is shown that the ratio β decreases with increasing distance from the shower axis and also decreases with increasing shower size over a range defined by electron densities in the immediate neighborhood of the axis of from 50 to 350 m^{-2}. *Subject Heading:* **1. Cosmic ray showers.**—*Authors' abstract.*

8.8–228 550.384:551.521.7

Kato, Yoshio and Akasofu, Syun-ichi, **Relationships between geomagnetic micropulsation and the solar *UM* region.** *Journal of Atmospheric and Terrestrial Physics*, 9(5/6):352–354, Nov. **1956.** fig., 9 refs. **DWB**—The regular micropulsations of period 20–30 sec are widespread in the sunlit hemisphere, and show a pronounced increase 1–4 days after central meridian passage of UM regions. Theory is discussed. *Subject Headings:* **1. Geomagnetic micropulsations 2. Solar emanations.**—*C.E.P.B.*

TEMPERATURE

See also: **Forecasting and regulating thermal regime** (Berliand), 8.8–9; **Accumulated temp. bibliog.** (Gloyne), 8.8–69; **Temp. stratification and Austausch problem over sea** (Brocks), 8.8–74; **Bamberg winters** (Dassler), 8.8–145; **Temp. measurement** (Saito), 8.8–154; **Forecasting late frost** (Ichikawa), 8.8–171; **Frost warning services, West Germany** (Wegelben), 8.8–174; **Semidiurnal temp. wave** (Kertz), 8.8–238; **Six-hour temp. wave** (Kertz), 8.8–239; **Dynamic turbulence and convection** (Lebedeva), 8.8–243; **Climatic change** (Satow), 8.8–299.

8.8–229 551.524.36:551.515.8(62)

Soliman, H. K. (*Met. Dept., Cairo*), **Heat waves over Egypt.** *Mathematical and Physical Society of Egypt, Cairo, Proceedings*, 1(5):91–101, May **1953.** table, 8 figs., 4 refs. **DWB**—Heat waves are classified as: moderate, severe, and excessive. The frequency of occurrence of each type at Cairo in each month of the year for a period of 20 years is given. The nature and causes in each season of heat waves over Egypt are discussed. Heat waves, especially the severe ones, were found to be connected with the movement of the quasi-stationary fronts separating the very hot air forming the thermal lows of the Sudan and the interior of N.W. Africa from the air north of it. The locations of the mean position of this quasi-stationary front in the different seasons, as well as the isotherms of mean maximum temperature, are given. The relation of heat waves to the oscillation of these quasi-stationary fronts is given and illustrated showing the importance of their accurate location and their movements on synoptic charts. *Subject Headings:* **1. Heat waves 2. Quasi-stationary fronts 3. Egypt.** —*Author's abstract.*

8.8–230 551.311.18(261.3):551.524.37

Ein früher Eiswinter in der Bottenwiek. [An early ice winter in the Gulf of Bothnia.] *Wetterlotse*, No. 109/10:266–269, Dec. **1956.** 2 tables. **DLC**—As forecast, ice formation in northern G. of Bothnia in 1956 was 20 days ahead of normal and developed rapidly in the last half of Nov. This was due to abnormally cold Aug.–Oct. Monthly temperature departures at Haparanda and Turku are given for 1954–1956. *Subject Headings:* **1. Sea ice variations 2. Severe winters 3. Gulf of Bothnia.**—*C.E.P.B.*

8.8–231 551.524.37(411)

Ritchie, W. G., **An example of freedom from fog, and an unexpected frost, at Kinloss and Dyce.** *Meteorological Magazine*, London, 86(1018):120–122, April **1957.** 2 figs., 2 refs. **DWB**—On April 4, 1955, temperature fell to 28°F and dew point from 44° to 46° to 26°F without fog formation. This is attributed to abnormally few condensation nuclei. *Subject Headings:* **1. Radiation frost 2. Scotland.**—*C.E.P.B.*

8.8–232 551.524.4:595.7

Johnson, C. G., **The vertical distribution of aphids in the air and the temperature lapse rate.** *Royal Meteorological Society, Quarterly Journal*, 83(356):194–201, April **1957.** 5 figs.,

table, 4 refs. **DWB**—Aphid densities were estimated from tow nets at 6 heights, 50–2000 ft on a balloon cable at Cardington and a 10 ft tower, May–Oct., 1948. Temperatures were measured at 3 ft and 2000 ft. Regression coefficient b of log (aphid density+1) on log ht varied from −1.25 in Sept.–Oct. to −0.78 in May–Aug. For lapse rates above adiabatic $-b$ decreases with increase of lapse rate. There are two maxima of density during day, 11–14 h at 1000 ft (unstable air) and 15½–20 h at 10 ft (stable air). At 500 ft the first max. is 2½ hrs later than at 10 ft. *Subject Heading:* **1. Aphid vertical distribution.**—*C.E.P.B.*

8.8–233 551.524.7:551.571.7

Helliwell, N. C.; Mackenzie, J. K. and Kerley, M. J., **Some further observations from aircraft of frost point and temperature up to 50,000 ft.** *Royal Meteorological Society, Quarterly Journal*, 83(356):257–262, April **1957.** 3 figs., 2 tables, 6 refs. **DWB**—Forty-six airplane observations with a pressurized frost-point hygrometer and flat-plate thermometer up to 50,000 ft during 1955 are tabulated. Mean frost point in 1954 and 1955 combined was −117°F at 48,000 ft and −115°F at 46,000 ft (*see also: M.R.P.*, 976, 1956). *Subject Headings:* **1. Upper air humidity 2. Upper air temperature 3. British Isles.**—*C.E.P.B.*

8.8–234 551.524.7:551.510.535

Lowan, Arnold N. (*Yeshiva Univ., N. Y. and Naval Res. Lab., Wash., D. C.*), **On the cooling of the upper atmosphere after sunset.** *Journal of Geophysical Research*, Wash., D. C., 60(4):421–429, Dec. **1955.** 2 figs., table, 21 eqs. **DLC**—The cooling of the "upper atmosphere" (region between the altitude $h_0=100$ km and the altitude $h_1=380$ km) after sunset was investigated under the assumptions that (a) the temperature at the altitude h_0 is constant and equals 240°K, (b) the temperature gradient at the altitude h_1 is equal to zero, and (c) the process of heat transfer takes place solely by conduction. Assumed initial temperature is that given by the Rocket Panel, ranging from 240°K at altitude h_0 to 1250°K at altitude h_1. For the sake of simplicity, thermal conductivity K and specific heat c were assumed constant and dependence of density p on temperature was ignored, the differential equation of heat conduction being solved numerically on the assumption that the density p and, therefore, the thermal diffusivity $\alpha=K/cp$ varies with altitude but is independent of time, the variation of p with altitude being that given by the Rocket Panel. The computations revealed that after 2½ hrs the temperature has not changed at altitudes below 160 km, and that the maximum drop at altitude h_1, is 440°K. From the computed temperatures at time $t=2^h$ (2 hrs), the densities were computed from formula (2). Computations revealed that a certain settling of the atmosphere takes place, the densities at time $t=2^h$ being larger than at time $t=0$ in some region, and correspondingly lower at altitudes above the upper limit of this region. Analysis of the ion density led to the conclusion that there is an appreciable increase of the ion density in the F layer in spite of the recombination of ions which takes place after sunset. *Subject Heading:* **1. Ionospheric temperature computation.**—*Author's abstract.*

SOIL TEMPERATURE

See also: **Soil thermometers** (MacDowall), 8.8–156.

8.8–235 551.525.5:551.579.4

Storey, Herbert C. (*Watershed Management Res. Div., U. S. Forest Serv.*), **Frozen soil and spring and winter floods.** *U. S. Dept. of Agriculture, Water: the Yearbook of Agriculture*, 1955:179–184. pub. **1955.** 20 refs. **DA, DWB**—The types of frozen ground, mechanics of freezing, effects of snow and vegetative covers, variations in frost penetration and area of frozen ground over U. S. as a whole and in small basins, relation between frozen ground and % of runoff, especially of snow melt, alteration of frozen ground conditions by planting forests and cultivation practices, processes in frozen soil where snow cover on top is thawing and other problems of infiltration, runoff and floods are discussed in connection with the highly uneven nature of frozen ground. *Subject Headings:* **1. Frozen soil 2. Snow melt runoff 3. Snow melt floods 4. United States.**—*M.R.*

WATER TEMPERATURE

See: **Sea surface temp., N. Atlantic, 1887–1936** (Riehl), 8.8–26; **Paddy water temp. effects on rice yield** (Tanaka), 8.8–90.

PRESSURE AND WIND

PRESSURE

See also: **Microbarograph oscillations from H-bomb** (Yamamoto), 8.8–114; **Barometric formula** (Pütter), 8.8–120; **Pressure effects on waves** (Greenspan), 8.8–205; **Pressure anomalies** (Pícha), 8.8–208; **Average height of isobaric surfaces** (Heastie), 8.8–256.

8.8–236 551.542:551.501.45:629.13

Warntz, William (*Univ. of Pa.*), **Proposal for tables of pre-computed values for pressure pattern flight.** *Navigation*, Los Angeles, 4(8):306–309, Dec. **1955.** 3 tables. **DWB, DLC**—Theoretical background and practical application of the tables under discussion are demonstrated. It is claimed that these tables will (1) save time, (2) minimize computional errors and (3) give all the possibilities of any flight at once, including emergency routes when bad weather is encountered enroute. The essential idea is to consider the K value $\left(\text{a latitude factor equal to } \frac{21.47}{\text{sin. Lat.}}\right)$ as a constant for the entire flight. *Subject Headings:* **1. Pressure pattern flying 2. Computation tables.**—*W.N.*

8.8–237 551.543:551.515.8(94)

Lynch, K. P. (*West Australia Div. Off., Perth*), **An unusual pressure fluctuation in the Great Australian Bight.** *Australian Meteorological Magazine*, No. 8:48–50, March **1955.** 3 figs. Also: Hannay, A. K. (*Cent. Met. Bureau*), **[Comment on] Unusual pressure fluctuation.** . . . *Ibid.*, No. 11:83–84, 86–88, Dec. **1955.** 3 figs. (p. 86–88). And **Reply of K. P. Lynch,** *Ibid.*, p. 84–85. **DWB**—The unusual pressure fluctuations observed on March 10, 1954 between 0300 and 2100 G.M.T. and from 1500 on March 11 to 0300 G.M.T. on March 12 is associated with a quasi-stationary front and an anticyclone divided into ten discrete cells by the front. The former could explain the pressure fluctuations. Hannay remarks that further analysis of report (*see* Figs. 1–3, p. 86–88) would indicate that the explanation could be made in terms of two moving anticyclones, rather than one quasi-stationary front, and that strong winds buffeting the ships could account for the rapid pressure fluctuations. The author says this could be. *Subject Headings:* **1. Pressure fluctuations 2. Frontal effects 3. Great Australian Bight.**—*I.L.D. & M.R.*

8.8–238 551.543.1:551.524.31

Kertz, W., **Components of the semidiurnal pressure oscillation.** New York. Univ. College of Engineering. Research Div. Dept. of Meteorology and Oceanography. Contract AF 19(604)-1006, Scientific Report No. 4, Oct. **1956.** 32 p. 4 figs., 7 tables, 9 refs., numerous eqs. **DWB**(?)—It is shown on the basis of data giving the geographical distribution of the semidiurnal pressure oscillation (S_2) that S_2 contains other component waves besides the migrating one (W_2^2) with two maxima and two minima around the earth's circumference and the standing one (Z_2). The most important of these additional component waves is W_2^3, that is a semidiurnal migrating wave with three maxima and three minima around the earth's circumference. The amplitude of W_2^3 is of the same magnitude as that of Z_2; its main term, if it is developed in a series of associated Legendre functions, is the one with P_2^3. The excitation of W_2^3 can be attributed to a similar term in the semidiurnal temperature oscillation. Comparisons between this and other analogous waves in the pressure and temperature form the basis for a discussion of atmospheric resonance conditions. *Subject Headings:* **1. Semidiurnal pressure waves 2. Semidiurnal temperature wave.**—*Author's abstract.*

8.8–239 551.543.1:551.524.31

Kertz, W., **The seasonal variations of the six-hourly planetary pressure and temperature waves.** New York. Univ. College of Engineering. Research Div. Dept. of Meteorology

and Oceanography. Contract AF 19(604)-1006, Scientific Report No. 5, Oct. **1956.** 39 p. 10 figs., 9+tables, 10 refs., numerous eqs. **DWB**—The 6-hourly pressure wave and its seasonal variation is described on the basis of more than 60 stations, [distributed throughout the earth] and the components of this wave and their geographic distributions are determined by harmonic analysis. The 6-hourly temperature wave, which is needed for a theoretical discussion of the 6-hourly pressure wave, was determined theoretically from considerations involving the incoming radiation, turbulent mass exchange, and outgoing radiation. The picture thus obtained is compared with empirical data given by PRAMANIK. The comparison between pressure and temperature wave leads to various questions concerning the nature of the exciting temperature waves and the resonance properties of the atmosphere. A resonance point was found at $h=10$ km. *Subject Headings:* **1. Six-hour pressure wave 2. Six-hour temperature wave.**—*Author's abstract.*

8.8–240 551.543.2:551.521.1

Loewe, F., [**Comments on**] **W. Schwerdtfeger and F. Prohaska: The semiannual pressure oscillation, its cause and effects; reply.** *Journal of Meteorology*, 14(2):187–188, April **1957.** 2 tables, 9 refs. **DWB**—LOEWE comments on Antarctic data in connection with paper by SCHWERDTFEGER and PROHASKA (*J. of Met.* 13(2):217–218, April 1956; *see* 7.9–175, Sept. 1956, *MAB*). SCHWERDTFEGER and PROHASKA reply. *Subject Headings:* **1. Semiannual pressure variations 2. Solar radiation variations.**—*C.E.P.B.*

8.8–241 551.543.4(94):551.515.7

Das, S. C. (*Ravenshaw College, Orissa, India*), **Statistical analysis of Australian pressure data.** *Australian Journal of Physics*, Melbourne, 9(3):394–399, Sept. **1956.** fig., 2 tables, 6 refs., eqs. **DLC**—We give a statistical analysis of the pressure data along the east coast of Australia, to test a hypothesis which arose out of DEACON's (1953) work, that there was a shift in the mean high pressure belt. It is shown that the belt is slowly moving southward. *Subject Headings:* **1. High pressure belt 2. Pressure trends 3. Australia.**—*Author's abstract.*

WIND AND TURBULENCE

See also: **Temp. stratification and Austausch problem over sea** (Brocks), 8.8–74; **Turbulence effect on aircraft operation** (Sugimoto), 8.8–84; **Weathervanes** (Needham), 8.8–157; **Windvanes** (Hartley), 8.8–158; **Smoke plumes** (Spurr, Priestly), 8.8–180; **Surface structure of trap. cyclones, India** (Koteswaram, Gaspar), 8.8–212; **Power spectrum of horizontal wind speed** (Van der Hoven), 8.8–249.

8.8–242 551.551:551.554

Arakawa, H., [**Comments on**] **Herman Lake: Clear-air turbulence associated with negative vertical wind shear. Reply by Lake.** *Journal of Meteorology*, 14(2):188–190, April **1957.** 2 refs., eqs. **DWB**—ARAKAWA explains LAKE's statistical results (*Geophys. Res. Paper*, No. 47, 1956; *see* 8.5–24, May 1957, *MAB*) that turbulence is associated with negative shear by the sign of the meridional component of absolute vorticity. He calculates that critical negative vertical shear for breakdown of zonal flow is 1 m/sec per 10 km at 45° lat. This is for indifferent equilibrium; in stable stratification effect of dynamic stability predominates. LAKE agrees that statistical results are in accord with ARAKAWA's arguments. *Subject Headings:* **1. Clear air turbulence 2. Wind shear.**—*C.E.P.B.*

8.8–243 551.551:551.524:536.711

Lebedeva, N. V., **K voprosu ucheta roli dinamicheskoĭ turbulentmosti dlia razvitiia konvektsii.** [The problem of evaluating the effect of dynamic turbulence in the development of convection.] *Meteorologiia i Gidrologiia*, No. 2:21–26, March/April, **1955.** 3 figs., 5 refs., 3 eqs. **DLC**—The author presents the formula of D. L. LAIKHTMAN for calculating effective potential temperature which he considered as a suitable characteristic for the analysis of the vertical condition of the atmosphere, the equations of curves supplementing the emagram for determining the strata within which turbulence develops and the formulas for the so-called

thermodynamic curve of stratification of N. Z. PINUS. The author's modifications of PINUS' equation are presented and their application is illustrated in the calculation of the role of dynamic turbulence in the development of convection. It is concluded that usually the total supply of positive energy of instability that characterizes dynamic turbulence is expended in the turbulence of mixing. Dynamic turbulence produces convection when the condensation level lies within the limits of the turbulent layers. *Subject Headings:* **1. Turbulence calculations 2. Potential temperature 3. Dynamic instability.**—*I.L.D.*

8.8–244 531.56:796.358:551.551

Lyttleton, R. A., **On the swerve of a cricket ball.** *Weather*, 12(5):140–146, May **1957. DWB**—Discussion of reasons why a cricket ball may swerve sideways in the air. Effects of roughness and critical speed on skin friction are described, including effect of seam directed to one side. "Late swerve" can be due to dipping of ball under gravity, reduction of speed below critical value due to air resistance or both. Humidity may also affect swerve, but factors are not yet understood. *Subject Headings:* **1. Skin friction 2. Cricket balls.**—*C.E.P.B.*

8.8–245 551.551

Millsaps, Knoc (*Wright-Patterson AFB, Ohio*), **The Obukhoff spectrum of homogeneous isotropic turbulence.** *Journal of the Aeronautical Sciences*, N. Y., 22(7):511, July **1955.** 3 refs., 2 eqs. **DWB, DLC**—The substitution used by J. BASS in the treatment of the Heisenberg spectrum may be used in the spectral equation of OBUKHOV for determining the Reynolds stress involved in shear between the energy in the microcomponents and macrocomponents. The resulting closed solution is

$$F(K)=\frac{1}{3K^2}\,[A+B]^{-\frac{1}{3}}[A'+B']+\frac{1}{3K^2}\,[A-B]^{-\frac{1}{3}}[A'-B']+\frac{2\nu^2K}{3\gamma^2}$$

for

$$0\leq K\leq\left(\frac{\epsilon\gamma^2}{4\nu^3}\right)^{\frac{1}{2}} \quad \text{and} \quad F(K)=0 \quad \text{for} \quad (\epsilon\gamma^2/4\nu^3)^{\frac{1}{2}}<k<\infty,$$

where

$$A=\frac{K^4}{432\gamma^6}\,(27\epsilon^2\gamma^4+18\epsilon\gamma^2\nu^3K^4+2\nu^6K^8) \qquad B=\frac{\epsilon K^2}{48\gamma^3}\left[\frac{27\epsilon\gamma^2+4\epsilon\nu^3K^4}{3}\right]^{\frac{1}{2}}$$

the primes denote differentiation with respect to K. *Subject Headings:* **1. Isotropic turbulence 2. Obukhov spectrum of turbulence.**—*M.R.*

8.8–246 551.555:551.584.42(52)

Misawa, Katsue and Misawa, Haruo, **On some phytometers of seasonal winds.** *Journal of Agricultural Meteorology*, Tokyo, 9(3/4):157–158, **1954.** 3 figs., 5 refs. In English; Japanese summary p. 158. **MH-BH**—This is a microclimatic study showing that the wind observations made at weather stations are sometimes not representative for the prevailing wind, especially in mountain provinces. Here, H. MISAWA edited his late father's manuscript to show an example of a case of south monsoon in summer over Nagano Prefecture. *Subject Headings:* **1. Wind distribution 2. Micrometeorology 3. Plant ecology 4. Japan.**—*H. Arakawa.*

8.8–247 551.551.5

Bullen, N. I., **The variation of gust frequency with gust velocity and altitude.** *Farnborough, England. Royal Aircraft Establishment, Report*, Structures, No. 216, **1956.** 6 p. 7 figs., 11 refs. Mimeo. **DNACA**—Recorded accelerations on aircraft were converted to gust velocities. Numbers of gusts exceeding various magnitudes were calculated and an empirical curve fitted. Frequency of occurrence of gusts greater than 10 ft/sec at different heights is plotted for cruise and for climb and descent. Miles per gust (climb and descent) increased logarithmically from 2.5 at 1000 ft to 800 at 25,000 ft, then constant. *Subject Heading:* **1. Gust frequencies.**—*C.E.P.B.*

8.8–248 551.551.8:533.1

Monin, A. S., **Gorizontal'noe peremeshivanie v atmosfere.** [Horizonal mixing in the atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:327–345, March 1956. 6 figs., table, 4 refs., 51 eqs. **DLC**—By means of the theory of similitude, the author explains the mode of distribution of concentrates of mixtures from various sources during diffusion into a turbulence field comprised of vortices of varying scales from an inertial spectral region. Equations of turbulent diffusion are developed and are used to devise universal functions whose existence depends upon the theory of similitude. *Subject Heading:* **1. Turbulent diffusion.**—*Trans. of author's abstract.*

WIND DISTRIBUTION AND WIND VARIATIONS

See also: **Climatic data of Netherlands lightships, 1910–1950** (Verploegh), 8.8–25.

8.8–249 551.553 551.551

Van der Hoven, Isaac, **Power spectrum of horizontal wind speed in the frequency range from 0.0007 to 900 cycles per hour.** *Journal of Meteorology*, 14(2):160–164, April **1957.** 7 figs., 2 tables, 11 refs. **DWB**—Selected portions of horizontal wind speed data from 91,108 and 125 m on Brookhaven tower were analyzed. Two main maxima were found, at 10 and 50 cycles per hr (4 days and 1.2 min), attributed to migratory pressure systems and turbulence. A minor maximum exists at 10^{-1} cycle (12 hrs). A broad gap extends from 1 to 10 cycles; this "spectral gap" is found in other records also. *Subject Headings:* **1. Wind variations 2. Gust spectrum.**—*C.E.P.B.*

8.8–250 551.553.6(410)

Shellard, H. C., **Extreme wind speeds over Great Britain and N. Ireland.** *Great Britain. Meteorological Office. British Climatological Branch, Memoranda*, No. 6, **1956.** 5 p. 3 figs., 3 tables. Mimeo. **GB-MO**—Gumbel's theory is applied to highest mean annual speeds and highest gusts at Cardington 1932–54, and gives return periods with sufficient accuracy. Analysis is then applied to values at 48 anemograph stations, reduced to 10 m above ground, and maps of hourly speeds and gusts likely to be exceeded once in 50 yrs are drawn. *Subject Headings:* **1. Wind frequencies 2. Extreme gusts 3. British Isles.**—*C.E.P.B.*

8.8–251 551.553.6:551.515.427

*Tolefson, H. B. (*Langley Aeron. Lab., Langley Field, Va.*), **Summary of derived gust velocities obtained from measurements within thunderstorms.** *U. S. N.A.C.A., Technical Note*, No. 3538, Oct. **1955.** 19 p. 7 figs., 3 tables, 9 refs. **DLC, DWB**—Available measurements of the derived gust velocities within thunderstorms are summarized for altitudes from 5,000 to 34,000 ft. The results indicate that the intensity of the derived gust velocity is essentially constant up to altitudes of 20,000 ft and that an approximate 10% reduction in the gust intensity occurs for altitudes from 20,000 to 30,000 ft. *Subject Headings:* **1. Gust velocities 2. Thunderstorms.**—*N.A.C.A. abstract.*

VERTICAL DISTRIBUTION

See also: **Clear air turbulence** (Arakawa, Lake), 8.8–242.

8.8–252 551.554

Tohsha, M. (*Met. Res. Inst., Japan*), **On the wind speed profiles in the lower atmosphere.** *Papers in Meteorology and Geophysics*, 4(3/4):104–108, Dec. **1953.** 6 figs., tables, 5 refs., eq. **MH-BH**—Mean hourly wind velocities measured on tower at 10, 90, 210 and 312 m height are given. A period of one week was utilized. The logarithmic law is followed in the midday but during the night and in the morning a break occurs in the profile. The calculated roughness length is 0.6 to 2.0 m in the lower layer and around 17 m for the upper layer during the night with a rapid increase after sunrise. *Subject Headings:* **1. Wind velocity profiles 2. Roughness length 3. Kawaguchi, Japan.**—*A.A.*

WIND EFFECTS

See also: **North Rhine-Westphalia wind protection mobile station** (Scultetus), 8.8–53.

8.8–253 551.463:551.556.8:532.593

Abe, T. (*Met. Res. Inst., Tokyo*), **A tentative analysis of wind wave in view of the foaming of sea water (A study on the foaming of the sea water, Pt. 11).** *Meteorological Society of Japan, Journal*, Ser. 2, 34(3):169–175, June 1956. 7 figs., 5 tables, 13 refs., 6 eqs. In Japanese; English summary p. 45. **DWB, DLC**—The present author treated tentatively the relation between the wind wave scales and the surface water temperatures in an open sea using the data of oceanographical observations taken at the Northern Fixed Point (39°N, 153°E) in the North Pacific Ocean in view of the foaming of sea water, and the following results were obtained: (1) The general features of the annual variation in wind waves were discussed. (2) The probability (P_3) of the appearance of the wind wave scale 3 has a tendency to decrease with increasing surface water temperature, that is to say, the lower the surface water temperature becomes, the stronger the foaming ability. (3) He defined a quantity $S(=\tau h_0)$, which is physically significant, in order to indicate the degree of foaming in actual cases where τ and h_0 represent the half life and the initial height of foam layer, respectively. Using the values of the quantity calculated from the results of his laboratory experiments, he could ascertain that the relationship mentioned above holds good approximately. *Subject Headings:* **1. Foam layer of sea water 2. Wind wave data 3. Sea surface temperatures 4. North Pacific Ocean.**—*Author's abstract.*

8.8–254 551.556.8:551.465(265/6)

Shtokman, V. B., **Teoreticheskoe opredelenie meridional'nykh granits zonal'noĭ tsirkuliatsii v svernoĭ polovine Tikhogo okeana.** [Theoretical determination of the meridional boundaries of the zonal circulation in the northern part of the Pacific Ocean.] *Meteorologiia i Gidrologiia*, No. 5:19–24, May 1956. 3 figs., 2 tables, 4 refs., 3 eqs. **DWB, DLC** Using the theory of equatorial counter currents developed earlier by the author and the data on the distribution of the zonal constituents relating to wind friction in July, the author attempts to determine the meridional boundaries of the equatorial counter current and then to compare the results obtained with observations. Only the summer boundaries of the equatorial current in the Pacific Ocean were determined. This current is most developed during the season and its meridional boundaries are most clearly evident. The equations and procedure for calculating the boundaries are presented and the results are given in tables and on a map. It was found that theoretical calculations and actual observations show a good qualitative correspondence; quantitatively the agreement is much poorer. *Subject Headings:* **1. Wind driven currents 2. Pacific Ocean.**—*I.L.D.*

8.8–255 551.556.8:532.593

Walden, Hans, **Stau der Wellenenergie im wandernden Windfeld.** [Accumulation of wave energy in travelling wind fields.] *Deutsche Hydrographische Zeitschrift*, 9(5):225–239, 1956. 8 figs., table, 9 eqs. German, English and French summaries p. 225–228. [**Continuation**], *Ibid.*, 9(6):280–289, 1956. 7 figs., 14 refs., eq. **DWB**—The sea development in a wind field advancing in the direction of the wind is computed. Waves continue to grow so long as they remain under the action of the wind, but the distribution of wave energy within the area depends on the length of the wind area (fetch), velocity w of the wind area, wind velocity in this area, duration of wind action at point of observation and the velocity of the wave components. If the group velocity of the longest wave component is smaller than w, the maximum wave development will occur at the rear of the fetch, but if the wind continues long enough the wind sea will become large and move to the front of the fetch. The second part deals first with long-lived wind fields of short duration at one point, travelling in the direction of the wind or against the wind. A number of actual cases were compared with theory. Relation of wave heights to wind and wave velocity, life of wind field, and distance from front edge of wind field are also discussed. *Subject Heading:* **1. Wind-wave energy transfer.**—*C.E.P.B.*

UPPER AIR WINDS

See also: **Arctic jet stream** (Lee, Godson), 8.8–45; **Forecasting procedures for optimum flight planning** (U. S. A. W. S.), 8.8–82; **Airborne measurements of atomic debris** (Machta et al.), 8.8–105; **Upper wind computation, Arctic** (Keegan), 8.8–125; **Upper air winds, N.W. Pacific** (Otsuka, Shimada), 8.8–169; **Baroclinic wave stability** (Spar), 8.8–196; **Jet stream, N. Africa and central Mediterranean** (Lamb et al.), 8.8–203; **Jet stream** (Roche), 8.8–204.

8.8–256 551.557.2:551.547

Heastie, H., **Average height of the standard isobaric surfaces over the area from the North Pole to 55°N. in April and October.** *Great Britain. Meteorological Research Committee' M. R. Papers*, No. 1020, 7 Dec. **1956.** 2 p. 22 plates, 5 refs. Mimeo. **DWB**—Average heights of standard isobaric surfaces in Jan. and July 1949–53 were given in *M.R.P.*s 918 and 981. Those for April and Oct. follow the same lines; contour heights (dkm) are given on circumpolar charts for 700, 500, 300, 200, 150 and 100 mb and intervening thicknesses, and peculiarities discussed, especially of April. *Subject Headings:* **1. Relative topography 2. Upper wind charts.**—*C.E.P.B.*

8.8–257 551.557.3(93, 94)

Radok, Uwe and Grant, Alison M., **Variations in the high tropospheric mean flow over Australia and New Zealand.** *Journal of Meteorology*, 14(2):141–149, April **1957.** 9 figs., 2 tables, 17 refs. **DWB**—Meridional height profiles of 200-mb surface were constructed for each month, Sept. 1949–Aug. 1952, for 5 longitudes 170–120°E, and flow charts drawn from these and resultant winds. For 11 months cross sections could be extended to 65°S. Strictly zonal mean flow was the exception. Half monthly charts for autumn 1952 show persistent difluence over New Zealand. Half-monthly zonal isotachs 900–100 mb, 15–65°S show Antarctic jet stream in 60°S as well as subtropical jet (20–30°S in winter, 40–50°S in summer). Seasonal changes are discussed; transitions from summer to winter flow were usually abrupt and on several occasions coincided with opposite transition in N. Hemisphere. *Subject Headings:* **1. Upper air wind variations 2. Australia 3. New Zealand.**—*C.E.P.B.*

8.8–258 551.557.35:551.509.317

Peterson, P., [**Comment on**] **J. R. Scott: The zonal wind in the upper troposphere and weather at Singapore.** *Royal Meteorological Society, Quarterly Journal*, 83(356):270–271, April **1957. DWB**—Peterson criticizes Scott's explanation (*R.M.S., Q.J.*, 82(353):340–341, July 1956; *see* 7.11–233, Nov. 1956, *MAB*) of fine weather over Singapore on summer and fall afternoons. Scott does not agree. *Subject Headings:* **1. Upper air wind persistence 2. Singapore.**—*C.E.P.B.*

8.8–259 551.557.5:551.513.1:608.4

Riehl, Herbert and Fultz, Dave, **Jet stream and long waves in a steady rotating-dishpan experiment: structure of the circulation.** *Royal Meteorological Society, Quarterly Journal*, 83(356):215–231, April **1957.** 16 figs., 18 refs., 3 eqs. **DWB.** Also issued as: Chicago. Univ. Dept. of Meteorology, Contract AF 19(604)-1292, Scientific Report, No. 1; Contract N6ori-02036, Project NR 082–120, Report on Research (unnumbered), Aug. **1956.** 13 p. 16 figs., 18 refs.—A 3-dimensional study was made of the flow of water in a rotating dishpan with inner cold source and outer heat source and 3 steady long waves. Trajectories, temperature field and geostrophic flow were determined. "The flow pattern resembles the basic features of the middle-latitude atmosphere in a remarkable way. Mobile long waves in a jet stream near the top overlie cyclonic and anticyclonic vortices farther down. There is, however, neither the counterpart of tropopause nor stratosphere in the temperature field, indicating that these features are not necessary for the development of the basic flow pattern. Further the distribution of momentum sources and sinks differs from that of the atmosphere. . . . Vertical motions are calculated in the interior of the fluid with the adiabatic assumption. Values again compare well with the atmosphere as does the distribution of centres of ascent and descent relative to long waves and cyclones. A positive correlation between temperature and vertical motion exists along the jet axis. . . . Absolute vorticity is calculated on constant temperature surfaces in the interior of the liquid. It is found that the theorem of conservation

of absolute vorticity is nearly fulfilled in the jet-stream layer with wave motion; in the lower layer with vortices, validity of the theorem of conservation of potential vorticity is indicated qualitatively. The regions of convergence and divergence, as inferred from the vorticity changes along the relative stream lines, agree qualitatively with the vertical motion distribution." *Subject Headings:* **1. Atmospheric circulation experiment 2. Jet stream models 3. Rotating dishpan models.**—*From authors' abstract.*

VERTICAL MOTION

See also: **Convection from earth's surface** (Priestley), 8.8–30; **Smoke plumes** (Spurr, Priestley), 8.8–180; **Ozone-vertical motion relationship** (Martin, Brewer), 8.8–186.

8.8–260 551.558.1

Smith, R. C., **Air motion over a heated land mass, Pt. 2.** *Royal Meteorological Society, Quarterly Journal*, 83(356):248–256, April **1957.** 4 figs., 2 tables, 3 refs., 18 eqs. **DWB**—In a previous paper (Smith, 1955; *see* 6.11–274, Nov. 1955, *MAB*), the problem of the resultant theoretical velocity field that arises from the diurnal variation of heating of a land mass with an initially stationary air mass was considered. The present paper considers the same problem with an initial overall velocity. The same heat function is used as in Pt. I for the time and horizontal variations, but the vertical variation is amended for closer approximation to the different circumstances. The difficulty of the boundary condition at infinite height is overcome by associating the solutions with those of Pt. I (*see* 6.11–274, Nov. 1955, *MAB*). The resulting surface temperatures and vertical velocities at different times are shown in tables and graphs. *Subject Headings:* **1. Air flow over heated land 2. Sea breeze circulation.**—*Author's abstract.*

8.8–261 551.558.21:551.43

Corby, G. A. and Sawyer, J. S., **The air flow over a ridge: the effects of the upper boundary and high-level conditions.** *Great Britain. Meteorological Research Committee, M. P. Papers*, 1015, Nov. 30, **1956.** 12 p. 4 figs., 7 refs., 25 eqs. Mimeo. **DWB**—The paper considers "what boundary conditions should be applied at great heights and whether the introduction of an upper boundary gives a justifiable approximation to the flow." Computations are made first on a two-layer airstream and then a four-layer airstream including a stable stratosphere surmounted by a layer of adiabatic lapse rate. It is concluded that "lee waves which have their largest amplitude in the upper troposphere and stratosphere can occur in certain airstreams . . . ; these are of somewhat longer wavelength and for their proper study require consideration of stability and wind in the stratosphere." *Subject Heading:* **1. Air flow over mountains.**—*C.E.P.B.*

8.8–262 551.558.21:551.43

Scorer, R. S., **Airflow over mountains.** *Royal Meteorological Society, Quarterly Journal*, 83(356):271, April **1957. DWB**—Gives a further discussion of question posed by P. A. Sheppard (*R.M.S., Q.J.*, 82(354):528–529, Oct. 1956, *see* 8.2–204, Feb. 1957, *MAB*). *Subject Heading:* **1. Airflow over mountains.**—*C.E.P.B.*

AQUEOUS VAPOR, HYDROMETEORS AND HYDROMETEOROLOGY

HUMIDITY

See: **Humidity extremes** (Maksic), 8.8–124; **Forecasting late frost** (Ichikawa), 8.8–171; **Upper air humidity** (Helliwell et al.), 8.8–233.

EVAPORATION AND EVAPOTRANSPIRATION

8.8–263 551.573:551.586:631

Rider, N. E., **Water losses from various land surfaces.** *Royal Meteorological Society, Quarterly Journal*, 83(356):181–193, April **1957.** 4 figs., 4 tables, 2 eqs. **DWB**—The aero-

dynamic method of calculating daily water losses from peas, grass and brussels sprouts was used near Cambridge, Eng., May–July 1955. Thermo-electric dry- and wet-bulbs were read at 2 heights 25 cm apart (set-up shown) and wind speeds at 5 heights. The differences in the water losses from various surfaces were too large to be accidental; on sunny days they were peas 2.5–7.5 mm, grass 2–3 mm, brussels sprouts about 4 mm, with no steady relation between them or loss from bare soil. *Subject Heading:* **1. Evapotranspiration estimates.**—*C.E.P.B.*

CONDENSATION

See also: **Biog. on W. C. Wells** (Green), 8.8–68; **Condensation nuclei measurement** (Pollak et al.), 8.8–163; **AgI for seeding individual clouds** (Warner, Twomey), 8.8–178.

8.8–264 551.574.1:551.576.11:534.321.9

Swinbank, W. C., **Crystallization of supercooled water by ultrasonic irradiation.** *Journal of Meteorology*, 14(2):190, April **1957. DWB**—The hypothesis that droplets could be made to freeze before impact with an airplane by vibrations of resonating frequency was tested in a wind tunnel. There was a substantial *increase* of catch when ultrasonic source was operating. It was concluded that vibration stimulated freezing of supercooled drops but the process was not complete before they reached the aerofoil. *Subject Headings:* **1. Freezing of water 2. Ultrasonic vibrations.**—*C.E.P.B.*

8.8–265 551.574.7:629.13

Jones, R. F., **Analysis of reports of ice accretion on aircraft.** *Great Britain. Meteorological Research Committee, M. R. Papers*, No. 1017, Nov. 23, **1956.** 21 p. 3 figs., 14 tables, 3 refs. Mimeo. **DWB**—Subjective reports of 800 cases of icing, classified as low, moderate and high, are analyzed for cloud type and temperature. Severe icing is most likely with Cu or CuNb but layer clouds also give significant frequencies. Some (235) reports of rate of ice formation are used to give rough values of water content. Clear ice, mixed ice and rime ice are then treated separately. The risk of severe clear ice formation is limited to temperatures of 0 to −15°C and short distances of high water content. Conditions for mixed ice, rime ice and no icing are also discussed. Icing is very unlikely below −35°C. Synoptic conditions when cloud water content reached 1.0 gm/m³ are considered and some remarks made on forecasting. *Subject Heading:* **1. Icing of aircraft.**—*C.E.P.B.*

FOG

See also: **Fog density indicator** (Bibby), 8.8–164; **Artificial fog dissipation** (Dufour), 8.8–177.

8.8–266 551.575.1

Timofeev, M. P., **K teorii advektivnykh tumanov.** [Theory of advective fogs.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 6:514–520, Nov./Dec. **1955.** 4 figs., 4 refs., 9 eqs. **DLC**—The author presents a quantitative analysis of the processes of formation of advective clouds in the layer of the atmosphere near the ground. The physical conditions leading to the formation of other type of fogs are summarized, and by solving the equations of turbulent diffusion of heat and moisture for the conditions prevailing in the atmosphere near the ground it is possible to characterize the conditions for the formation of advective clouds as a function of the initial properties of the atmosphere and the underlying surface. In evaporative fogs, it shows that in addition to the initial characteristics (temperature, humidity) of the air advected to the surface of the water, the size of the water surface and the intensity of turbulent exchange of heat and moisture between the water surface and the moving air, are important factors in fog formation. Preliminary numerical results on the natural dispersion of evaporative fogs are presented. *Subject Headings:* **1. Advection fog 2. Advection clouds 3. Fog formation.**—*I.L.D. and Author's abstract.*

CLOUDS

See also: **International Cloud Atlas** (WMO), 8.8–35; **Cloud heights from "Comet" reports** (Ramamurthi), 8.8–83; **Photographic sky mirror** (Georgi), 8.8–160; **Crystallization of supercooled water** (Swinbank), 8.8–264.

8.8–267 551.576.11:551.577.1

Ludlam, F. H. and Saunders, P. M. (*both, Imperial College, London*), **Shower formation in large cumulus.** *Tellus*, Stockholm, 8(4):424–442, Nov. **1956.** 18 figs., 4 tables, 24 refs., 10 eqs. **DLC**—A distinction is drawn between the appearance of evanescent fibrous streaks in decaying cumulus towers (*fibrillation*), and the *glaciation* of cumulus. A technique of measuring cumulus is described, and used to show that fibrillation, which marks the onset of shower formation, occurs when cumulus towers reach a *fibrillation zone* or a *fibrillation level*; towers which rise appreciably above this zone glaciate if supercooled. The fibrillation level varies from occasion to occasion, apparently according to the strength of the cloud updraughts, and in a manner which indicates the coalescence process to be the general shower-*forming* agency in clouds observed in Sweden, although the temperatures at the summit-level of incipient showers may be as low as −20°C. Observations were made near Östersund in Jämtland Province, Central Sweden in the summer months of 1954 and 1955. *Subject Headings:* **1. Shower formation 2. Cumulus cloud structure.**—*Authors' abstract.*

8.8–268 551.576.1:551.515.3

Nicholas, R. T., **Funnel cloud off Ramsgate on August 5, 1956.** *Meteorological Magazine*, London, 86(1018):122–123, April **1957.** fig. **DWB**—A rounded bulge appeared in the base of a CuNb cloud and developed a tail which "flailed round for a short time" (sketch). *Subject Headings:* **1. Funnel clouds 2. Ramsgate, Eng.**—*C.E.P.B.*

8.8–269 551.576.11:551.501.8

Harper, W. G.; Ludlam, F. H. and Saunders, P., **Preliminary report on cumulus investigations, East Hill, June–August, 1956, and on plans for future similar work.** *Great Britain Meteorological Research Committee, M. R. Papers*, No. 1019 Nov. 22, **1956.** 9 p. Mimeo. **DWB**—Evolution of Cu clouds was followed visually with 2 theodolites and by 10 cm and 3 cm radar and aircraft soundings. "Mantle echoes" on 10 cm but not 3 cm radar from non-precipitating cloud are probably refractive effects from abrupt gradients of vapor pressure; angels are attributed to strong temperature gradients at caps of rising thermals. Development of shower echoes and relation between cu properties and screen level observations are discussed. Plans for future work are set out, including seeding experiments. *Subject Headings:* **1. Cumulus cloud structure 2. Angels 3. Mantle echoes 4. Radar analysis of clouds.**—*C.E.P.B.*

PRECIPITATION

See also: **Drought effects on pasture,** 8.8–91; **Radar precip. echoes** (Gupta et al.), 8.8–130; **Floods, S.E. Scotland, Aug. 1948** (Learmonth), 8.8–143; **Shower formation in large cumulus** (Ludlum, Saunders), 8.8–267; **Rainfall frequencies** (Nash), 8.8–280.

8.8–270 551.577.3:551.590.25

Ramage, C. S., [**Comments on**] **E. G. Bowen: The relation between rainfall and meteor showers. Reply of Bowen.** *Journal of Meteorology*, 14(2):186–187, April **1957.** table, 13 refs. **DWB**—RAMAGE points out that BOWEN has ignored critics of his meteoric dust theory. BOWEN replies that criticisms are based on partial short period data (only 491.6 station yrs) whereas he used 15,000 station yrs. *Subject Headings:* **1. Rainfall variations 2. Meteor shower effects.**—*C.E.P.B.*

8.8–271 551.577.37

Lovett, N. B. (*Asst. Eng., Water Investigations Sub-Branch, Water, Sewerage & Drainage Bd., Sydney*), **Estimation of maximum possible precipitation.** *Institution of Engineers (of) Australia, Sydney, Journal*, 26(10/11):217–224, Oct./Nov. **1954.** 10 figs., 9 refs. **DLC**—Methods of estimating limiting rates of precipitation based on rational consideration of storm

mechanisms and their effect on moisture-bearing air masses have been developed by the Hydrometeorological Section of the U. S. Weather Bureau. (1) Theoretical computation using maximum values of meteorological elements affecting precipitation. (2) Maximisation and transposition of recorded storms, using moisture adjustment based on surface dewpoints. (3) Thunderstorm rainfall. Basic theories, and methods of calculation outlined enable dependable preliminary estimates of maximum possible precipitation to be made by hydrologic engineers. The use of limiting precipitation rates for spillway design purposes and determination of maximum probable precipitation rate is discussed. *Subject Heading:* **1. Maximum possible precipitation.**—*Author's abstract.*

8.8–272 551.577.38(439.1)

Kakas, József, **Az 1953. évi márciusi szárazság éghajlattani vizsgálata.** [Climatological study of the March 1953 drought.] *Beszámolók az 1955-ben végzett tudományos kutatásokról* (issued as *Hungary. Orszagos Meteorologiai Intezet, Hivatalos Kiadványai*, Vol. 20, pub. **1955.** p. 67–78. 16 figs., 12 refs. Russian and French summaries p. 67. **DWB**—Rainfall deficiency in Hungary in March 1953 is discussed and compared with earlier amounts of precipitation in Feb. and March. The following data are presented: a graph showing average Feb. and March precipitation in Hungary (as computed from five selected station records) for each year of the period 1901–1954; charts of precipitation, temperature and pressure distribution over Europe in March 1953 (in % of normal); charts of Hungary showing distribution of meteorological elements in March 1953, namely anomalies of pressure, temperature, cloudiness, relative humidity and precipitation; and a chart showing variations of the various meteorological elements at Budapest from Feb. 15 to April 16, 1953. With its average precipitation of 7 mm in March, the year 1953 ranks fourth since 1901 in respect of precipitation deficiency for that month in Hungary. *Subject Headings:* **1. Drought 2. Hungary.**—*G.T.*

8.8–273 551.577.38:633.1(73)

McQuigg, James D. (*U. S. W. B., Omaha, Nebr.*), **Drought 1955.** *Weatherwise*, Boston, 9(1):14–15, Feb. **1956.** 6 figs. **DWB**—Dust storms in spring of 1955 in the Plains damaged wheat crop beyond recovery in some sections but rains on May 17–19 laid the dust and restored crops in many areas. Hot dry weather in Aug. and early Sept. damaged corn crop in many sections. Maps of U. S. show extent of precipitation in week of May 16–22, 1955 (>4 in. in Kansas, Okla. and Texas wheat belts), and Aug. precipitation. Also maps show yield per acre of all crops in 1955 and 1954, as % of normal. *Subject Headings:* **1. Drought, Great Plains (1955) 2. Crop yields 3. Great Plains, United States.**—*M.R.*

RAIN, SNOW AND HAIL

See also: **Snow and snowmelt,** 8.8–2; **Raindrop size distribution and radar reflectivity** (Jones), 8.8–28; **Radioactive hailstones** (Blifford et al.), 8.8–97; **Rain removal of radioactive products** (Greenfield), 8.8–102; **Radioactivity of rainwater** (King et al.), 8.8–103; **Radar hail warnings** (Roncali), 8.8–127; **Snow echoes** (Douglas et al.), 8.8–129; **Winter of min. snowfall, Toronto** (Thomas), 8.8–144; **Drop size distribution instruments** (Liddell, Wooten), 8.8–161; **Drop size measurement** (Margarvey), 8.8–162.

8.8–274 551.578.11

Mordy, W. A. and Eber, L. E., **Observation of rainfall from warm clouds.** (In Mordy, W. A. et al., **Cloud seeding project, Summary report, 1952–1953.** Honolulu, [1954?] p. 1.1–1.18. 10 figs., 2 tables, 16 refs.)—Data obtained in detailed observations of rainfall on Oahu Island during ten days in June 1952 are presented. The observation included temperature and humidity soundings from airplane, raindrop size sampling, rainfall measurement with 37 gages over 130 sq mi, pilot balloon ascents, time-lapse photography of clouds, photography from aircraft and the Honolulu radiosonde and wind data. The results obtained indicate that: "1) Large amounts of rainfall can occur from warm clouds with only moderate vertical development. 2) Raindrops of more than 2 mm diameter can regularly form in clouds less than 7000 ft thick. 3) Rainfall from warm clouds is very frequent and contributes substantially to the total rainfall for some areas." (*Same as* 5.9–8, Sept. 1954, *MAB.*) *Subject Headings:* **1. Rainfall studies 2. Rain from nonfreezing clouds 3. Oahu, Hawaiian Islands.**—*G.T.*

8.8–275 551.578.11:546.13

Oddie, B. C. V., **A note on the published results of studies in atmospheric chemistry.** *Great Britain. Meteorological Research Committee, M. R. Papers*, No. 1014, Nov. 12, **1956.** 5 p. 6 refs. Mimeo. **DWB**—This paper is "intended as a basis for a general discussion of policy with respect to chemical sampling." The history of atmospheric chemistry is summarized, including variations of chlorine/sodium ratio in rainwater. Questions requiring elucidation are listed; they require an extensive network of observing stations. Suggestions for further work are made. *Subject Headings:* **1. Atmospheric chemistry 2. Chlorinity of rainwater.**—*C.E.P.B.*

8.8–276 551.578.42(54)

*India. Meteorological Dept., **Observations of Himalayan snowfall and snow-cover made by the Indian Meteorological Department.** *I.U.G.G. International Association of Scientific Hydrology, Oslo, 1948.* [*Transactions*], 1:109–114, [1950?] fig., 5 tables, 2 refs. **DWB**—Report on snow observations in India, data collected since 1866, also systematic qualitative information since 1876. Correlations between snow conditions and monsoon discussed. Snowfall data (1876–1947) given for Northwest India. Normal annual precipitation for the Cosi catchment (28°N, 87°E) is 77″, from which 59% runs off. *Subject Headings:* **1. Snowfall data 2. Runoff 3. Long period records 4. Himalayas, India.**—*A.A.*

8.8–277 551.578.46:313

Friedrich, W. (*Vienna*), **Lawinen im Sonnblickgebiet.** [Avalanches in the Sonnblick area.] *Sonnblick-Verein, Vienna, Jahresbericht*, 49/50:33–36, 1951–1952, pub. **1954.** 2 figs. **DLC**—Temperature increasing from −15 to −10°C or from −10 to −5°C at 2000 m or above, is indicated as the principal factor responsible for the disastrous avalanche activity of Jan. 1951. This rise in temperature, although still sub-freezing, led to an intensification of precipitation and the formation of cavities in the snow cover. Details of the resulting avalanches are discussed. *Subject Headings:* **1. Avalanche disasters, Sonnblick (Jan. 1951) 2. Sonnblick, Austria.**—*G.T.*

8.8–278 551.578.7:69(778)

Bombardment by hail. *Factory Mutual Record*, Boston, 31(12):3, Dec. **1954.** photos. **DWB**—Photographs show damage to roads, roofing, and glass panes by irregular hailstones up to baseball size, which occurred during a severe storm on Sept. 19, 1954(?). The storm was 1 mi. wide and 10 mi. long and lasted 15 min. Tar and gravel roofing was undamaged except for flashings. More than 5000 skylights and windows were broken. *Subject Headings:* **1. Hail damage 2. Roofing endurance to hail 3. Hailstorms 4. St. Louis, Mo.**—*M.R.*

HYDROMETEOROLOGY

See also: **Hydrol. symposia** (Allard), 8.8–54; **Glossary of hydrologic terms,** 8.8–72; **Hydrologic yearbook, Arno Basin,** 8.8–140; **Floods, S.E. Scotland, Aug. 1948** (Learmonth), 8.8–143.

8.8–279 551.579.4(282.243)

Láng, Sándor, **A Duna árvize 1956 tavaszán.** [Danube flood in the spring of 1956.] *Földrajzi Közemények*, Budapest, 80(3):251–267, **1956.** 4 photos, 2 tables. **DLC**—The unusual Danube flood of March 1956 was caused by heavy snow accumulation in the mountains around the upper course of the river, sudden warming accompanied by precipitation and, finally, a cold wave during which the obstructed river ice froze into blocks. Details of the flood in Hungary are described. Daily temperature data for March 1956 are presented for 8 stations from Munich to Belgrade. Earlier remarkable Danube floods are mentioned and some comparative data shown. *Subject Headings:* **1. Danube floods 2. Danube River.**—*G.T.*

8.8–280 551.482:551.579.4:551.577.36

Nash, J. E., **Frequency of discharges from ungaged catchments.** *American Geophysical Union, Transactions*, 37(6):719–725, Dec. **1956.** 7 figs., table, 3 refs., 15 eqs. **DWB, DLC**—

A method is presented by which the frequency of discharges from ungaged catchments can be related to the rainfall frequency and the unit hydrograph for the catchment. The application of the method to well drained catchments in Ireland is demonstrated. *Subject Headings:* **1. River discharges 2. Rainfall frequencies.**—*Author's abstract.*

8.8–281 551.579.4:368.1(

Overman, Edwin S., **The flood peril and the Federal Flood Insurance Act of 1956.** *American Academy of Political and Social Science, Annals*, 309:98–106, Jan. **1957.** 17 refs. **DWB**—Floods are the most destructive of natural disasters; the 1951 floods in the Southwest caused property damage estimated at two and a half billion dollars. By comparison, all property and casualty insurance companies pay annually for losses totaling about one billion dollars, or about twice the average annual cost of floods. Private insurance companies do not regard flood peril, therefore, as an insurable risk. The Federal Flood Insurance Act of 1956 is designed to fill this gap. It provides for the establishment of a program of insurance, reinsurance, and loans to assist persons to recover from loss due to destruction by floods. The author analyzes the act in some detail. *Subject Heading:* **1. Flood insurance.**—*Author's abstract.*

8.8–282 625:631.4:551.579.5

Rao, K. Subba and Ramacharlu, P. T., (*both, Defence Science Lab., New Delhi*), **Improving the trafficability of soils by heat treatment.** *Journal of Scientific and Industrial Research, Sec. A*, New Delhi, 14(10):474–479, Oct. **1955.** 12 figs., table, 7 refs. **DWB, DLC**—Quantitative data obtained at Delhi during tests of porosity changes, pore size distribution, permeability to water, plasticity, shearing strength, and other aspects of soil stabilization by heating up to 1000°C are presented in graphical form. The pF-water relationships are especially significant. Permeability decreases up to 60°C and then increases up to 650°C. *Subject Headings:* **1. Soil trafficability 2. Heat treatment of soils 3. Soil permeability.**—*M.R.*

CLIMATOLOGY AND BIOCLIMATOLOGY

CLIMATE OF PARTICULAR PLACES

See also: **Climate of Arizona** (Ariz. Agric. Experiment Station), 8.8–22; **Climate of Lower Rhine** (Weischet), 8.8–23; **Climatic atlas Rhineland-Pfalz** (Ger. Deut. Wetterdienst), 8.8–33; **Climate of N.W. European waters** (Bullig, Bintig), 8.8–73; **Sugar cane cultivation in Andalusia and Louisiana** (Blume), 8.8–86; **Climate of Bechuanaland** (Van Rooy, Drummond), 8.8–134; **Phenological chart, France** (Schnelle), 8.8–149.

8.8–283 551.582(262)

Mensching, Horst, **Mallorca—Korsika—Sardinien. Ein kulturgeographischer Vergleich.** [Majorca—Corsica—Sardinia: a comparative study.] *Die Erde*, 88(1):39–52, **1957.** 4 figs., 13 refs. English summary p. 39. **DLC**—The three western Mediterranean islands are compared as regards geology, geography and climate. Climatic diagrams are given for Palma (Majorca), Sassari and Cagliari (Sardinia) and Ajaccio (Corsica). Culture and population are then discussed. *Subject Headings:* **1. Local climate 2. Majorca 3. Corsica 4. Sardinia.**—*C.E.P.B.*

8.8–284 551.582(234.8):551.585.7

Nefed'eva, E. A., **Osobennosti razvitiia gornykh sklonov khrebta Tsakhkuniats, Malyi Kavkaz.** [Development of mountain slopes of Tsakhkuniats, Little Caucasus.] *Akademiia Nauk. Institut Geografii, Trudy*, No. 65:190–195, **1955.** 11 refs. **DLC**—Contains a description of the general climate prevailing over the Tsakhkuniats mountain range and of the winter snow cover and its role in erosion. *Subject Headings:* **1. Mountain climatology 2. Climate of Tsakhkuniats Mountains 3. Little Caucasus, U.S.S.R.**—*I.L.D.*

8.8–285 551.582(55)

O'Good, R. D., **The Bahrain Islands and their desert flora.** (In: Institute of Biology, London, **Biology of deserts.** London, **1954.** p. 45–55. 4 figs.) **DWB**—Thus study contains

a description of the climate of the Bahrein Islands including data on mean monthly temperature, absolute maximum and absolute minimum temperatures and mean monthly rainfall. *Subject Headings:* **1. Local climatology 2. Climate of Bahrein Islands, Persian Gulf.**—*I.L.D.*

8.8–286 551.582(766)

*Oklahoma. Univ. Institute of Community Development, **Oklahoma's weather and climate, 1952.** Oklahoma City, Industrial Development Div., Oklahoma Planning and Resources Board (1952). 27 p. 3 figs., 7 maps, 4 tables. **DLC**—This account of the characteristics of the meteorological variables contains a graph of mean monthly rainfall, isolines of precipitation, temperature, dates of first and last killing frost, and temperature and rainfall summary by county. *Subject Headings:* **1. Local climatology 2. Climate of Oklahoma 3. Oklahoma.**—*I.L.D.*

8.8–287 551.582(439.1)

*Válóczi, László, **Gödöllő éghajlata.** [The climate of Gödöllő.] *Budapest. Agrártudományi Egyetem. Agrárközgazdasági Kar, Kiadványai*, 1(3), **1955.** 14 p. fig., 7 refs. Russian and German summaries p. 12–14. **DLC**—Climatic values for Gödöllő are derived from 50 years of record (1901–1950). The monthly means presented include average, maximum and minimum temperature, number of extremely cold (min. below 0°C or −10°C) and extremely warm days (max. above 25°C or 30°C), precipitation amount, maximum 24-hr precipitation, number of days with precipitation, snowfall, snow cover and hail, atmospheric pressure and wind direction frequencies. Results are compared with conditions in the mountains to the north and the plains to the south, the Gödöllő region occupying an intermediate position between the two. According to Köppen's climatic classification, the climate of Gödöllő may be assigned the index Cfbx. As far as agriculture is concerned, it is best suited to growing rye, potatoes and tomatoes. *Subject Headings:* **1. Climate of Gödöllő, Hungary 2. Local climates 3. Gödöllő, Hungary.**—*G.T.*

8.8–288 551.582.2(45)

*Bilancini, Raoul, **Tavole climatologiche di alcune stazioni italiane: Domodossola, Milano, Treviso, Alassio, Genova, Bologna.** [Climatic tables for some Italian stations: Domodossola, Milan, Treviso, Alassio, Genoa, Bologna.] *Rivista di Meteorologia Aeronautica*, 16(4):31–37, Oct./Dec. **1956.** 12 figs., 6 tables, 5 foot-refs. French, English and German summaries p. 31. **DWB**—Monthly mean climatic values are tabulated and graphically presented for six stations in northern Italy. The parameters covered are average precipitation amount, number of rain days, average, maximum and minimum monthly mean temperature, absolute maximum and minimum temperature, and average daily cloudiness. *Subject Headings:* **1. Climatic data 2. Climate of Northern Italy 3. Italy.**—*G.T.*

8.8–289 551.582.2(45)

*Moja, Mario, **Ricerca statistica sugli elementi meteorologici del clima di Varese.** [Statistical study of the meteorological elements in the climate of Varese.] *Milan. Osservatorio Astronomico di Milano-Merate, Pubblicazioni*, n.s., No. 9, **1955.** 79 p. 12 figs., 33+tables, 7 refs., numerous eqs. **DWB**—Monthly mean values of temperature (average, deviation, mean and absolute maxima and minima, cold winters and warm summers, seasonal and annual temperature variations, etc.), humidity, cloudiness, fog, precipitation, thunderstorms, hail, snow, pressure and wind are tabulated for Varese for the period 1931–1945. Detailed explanations on the methods of computation are included. Annual variations of the different elements are also graphically presented. *Subject Headings:* **1. Local climates 2. Climate of Varese, Italy 3. Varese, Italy.**—*G.T.*

CLIMATIC CHANGES

See also: **Climatic conditions and atmos. circulation** (Yakuwa), 8.8–201.

8.8–290 551.583.13

Ten Kate, H., **De zomer van 1955.** [Summer of 1955.] *Hemel en Dampkring*, The Hague, 53(10):194, Oct. **1955. DLC, DWB**—The summer of 1955 in Holland was relatively

dry, the total rainfall amounting to 134 mm against a normal of 201 mm. Sunshine amoun was 641 hrs as compared with a normal of 623 hrs. Temperature was also below normal *Subject Headings:* **1. Abnormal summer, 1955 2. Summer climate 3. Netherlands.**—*I.L.D*

8.8–291 551.583.14

Hawke, E. L., **April's changed weather.** *Weather*, 7(8):241, Aug. **1952.** table. **DWB**—Comparison of weather at Hampstead, London, 1910–42 and 1943–52. *Subject Headings:* **1. Climatic trends 2. London, Eng.**—*C.E.P.B.*

8.8–292 551.583.3:551.521.12:551.521.3

Wexler, H. (*U. S. W. B., Wash., D. C.*), **Variations in insolation, general circulation and climate.** *Tellus*, Stockholm, 8(4):480–494, Nov. **1956.** 10 figs., 21 refs. **DLC**—Two primary causes of variation in insolation—changes in solar output and in atmospheric transmission—are discussed, particularly with respect to basic changes in the mid- and high latitude circulation pattern. Sunspot maxima in winter, on the average, are associated with greater tendency toward circulation blocks over the Northern Hemisphere and favorable conditions for heavy snow in regions known to have been glaciated in the past (Wisconsin) ice age. An explanation, based on an assumed greater insolation during sunspot maxima, is proposed. But summer weather conditions during sunspot maxima do not appear to favor preservation of the previous winter's accumulation of snow and ice. Hence an alternative explanation, based on *decreased* insolation accompanying periods of high atmospheric turbidity is proposed. The unequal response of continents and oceans to the decreased insolation causes heavy snow blankets to be deposited in areas known to have been glaciated and the lesser insolation in summer helps preserve a remnant of the snow until the next winter's contribution. *Subject Headings:* **1. Ice age theories 2. Solar radiation variations 3. Turbidity.**—*Author's abstract.*

8.8–293 551.583.3:571

Wissmann, Hermann Von, **Ursprungsherde und Ausbreitungswege von Pflanzen- und Tierzucht und ihre Abhängigkeit von der Klimageschichte.** [Centers of origin and ways of dispersal of plant and animal breeding and their dependence on the history of climate.] *Erdkunde*, 11(2):81–94, May **1957.** 4 figs., foot-refs. English summary p. 81–82. **DWB**—Civilization began in river and coast forests along Bay of Bengal and spread to Mesopotamia, N. Africa and N. China in a series of waves which author correlates with world-wide temperature changes in late- and post-glacial periods. Highlands of Armenia and W. Iran became favorable for farming in warm period of 6th millennium but deserts were drier. Oases increased again about 2500 B.C. *Subject Headings:* **1. Postglacial climates 2. Prehistory.**—*C.E.P.B.*

MICROCLIMATOLOGY

See also: **Climate near the ground** (Geiger), 8.8–14; **Barn climates** (Ádám, Batta), 8.8–85; **Micromet. instruments** (Long), 8.8–150; **Phytometers of seasonal wind** (Misawa, H., Misawa, K.), 8.8–246.

8.8–294 551.584.42:551.45(675):019.941

Institut des Parcs Nationaux du Congo Belge, **Exploration du Parc National de la Garamba. Mission H. de Saeger, et al.** pub. Brussels, **1940–** Fasc. 6, Noirfalise, Albert: **Le milieu climatique.** [The climatic environment.] pub. **1956.** 75 p. **DLC(?).** Summary in *Nature*, London, 179(4567):955, May 11, **1955.** ref. **DWB** –Summarizes first the macroclimate, and then the microclimate of the grasslands. Well on in rainy season maximum temperature of 32°C occurs 10 cm above ground, where temperature is only 27°C compared with 45°C on bare soil. Microclimate under clumps of shrubs and trees and in dense forests along rivers is also described. *Subject Headings:* **1. Savanna microclimatology 2. Belgian Congo.**—*C.E.P.B.*

8.8–295 551.584.42(439.1)

*Wagner, Richárd, **Adatok a Délkelet-Alföld mikroklímájához.** [Data on the microclimate of the southeastern plains of Hungary.] *Földrajzi Értesítő*, Budapest, 5(2):135–160, **1956.** 13 figs., 4 tables, 7 refs. Russian and German summaries p. 158–160. **DLC**—Microclimatic temperature data obtained in southeastern Hungary during several days in July 1952

are presented and commented on. One set of data refers to temperatures measured at various heights up to 2 m in a wheat field before, during and after harvesting. The purpose of these measurements was to determine working conditions during the different harvesting operations. Data on percentage of reflected light reaching workers' forehead during various operations are included. Workers on machines are found to be under better general conditions than those on the ground. Other sets of data cover comparisons between temperature conditions of different crops such as barley, cotton, etc. It is suggested that in selecting suitable locations for growing certain plants it is not enough to consider the general climate, nor even the microclimate of a location, but the special microclimate which will be produced by the growing plant itself also has to be anticipated. Successful experiments involving modification of radiation conditions by means of artificial reflecting surfaces are also mentioned in the article. *Subject Headings:* **1. Microclimatology of crops 2. Hungary.**—*G.T.*

8.8–296 550.36:551.584.65

Clark, Sydney P., Jr. and Niblett, E. R., **Terrestrial heat flow in the Swiss Alps.** *Royal Astronomical Society, Monthly Notices, Geophysical Supplement,* 7(4):176–195, Aug. **1956.** 8 figs., 5 tables, 27 refs. **DWB**—Terrestrial heat flow has been measured in three Alpine railroad tunnels. The geothermal gradients were calculated from temperatures measured during the construction of the tunnels, and corrections for topographic irregularities were made. The thermal conductivity of 113 rock specimens from the vicinity of the tunnels was measured. The heat flow in the Gotthard tunnel was found to be 1.6×10^{-6} cal/cm² sec, in the Simplon 2.2×10^{-6} cal/cm² sec, and in the Loetschberg 1.9×10^{-6} cal/cm² sec. Most of the flux at the surface can be attributed to radioactive decay in a thickened crust, but a nonuniform distribution of radioactive elements may be required to explain the relatively high heat flow in the Simplon and Loetschberg tunnels. *Subject Headings:* **1. Thermal conductivity 2. Tunnel temperatures 3. Swiss Alps.**—*Authors' abstract.*

CLIMATIC CLASSIFICATION

See also: **Mountain climatology** (Nefed'eva), 8.8–284.

8.8–297 551.585:576.1 552.583.7

Dachille, Frank (*Chem. Engr., Pensacola, Fla.*), **Effect of type of climate in evolution.** *Alabama Academy of Science, Journal,* 26:91, Dec. **1954. DLC**—Factors determining the overall climate of the earth are discussed to develop the relative effects of oceans, atmosphere, daily rotation, orbital motion and inclination of the axis to the ecliptic. Types of climate are then described to differentiate between local or superficial forms and the types of planetary nature. The major types of climate, based on the inclination of the axis are described, tracing the seasons for each hemisphere (North and South). The effect of speed of daily rotation is superimposed to demonstrate the varieties of climates possible. A correlation is made of the main features of the dominant forms of life on the evolutionary scale with the optimum type of climate. The reality of axis change for the earth is considered using a background of astronomical and geological evidence. (Abstract of paper presented at the 14th annual meeting of the Alabama Academy of Science, 1954.) *Subject Headings:* **1. Climatic types 2. Evolution 3. Climatic change theories.**—*Author's abstract.*

BIOCLIMATOLOGY

See also: **Air conditioning and heating symposia,** 8.8–4; **Weather sensitivity** (Faust), 8.8–94; **Water losses from land surfaces** (Rider), 8.8–263.

8.8–298 551.586:63

*†Nuttonson, Michael Y. (*Amer. Inst. Crop Ecology*), **Ecological crop geography and field practices of the Ryukyu Islands, natural vegetation of the Ryukyus, and agro-climatic analogies in the Northern Hemisphere.** Wash., D. C., American Institute of Crop Ecology, **1952.** 106 p. 14 figs., 9 tables, chart (fold.), bibliog. p. 105–106. **DWB**—A thorough study, accompanied by tabular and graphic data and charts, of all available information on the vegetation, forests, soils, crops and climate of the Ryukyu Islands. Under the heading of climate the elements discussed are: monsoons, gales, typhoons, Japan Current, temperature, precipitation, clouds, fog and relative humidity. Analogs found in other parts of the Northern Hemisphere

are discussed at length and tabulated on the basis of year round, spring crop and winter crop analogs, for 31 stations in the chain of Islands. Most of the analogs are found in Louisiana, Florida, Hawaii, Egypt, India, Cuba, Formosa, or the Canary Islands. Analogs are also shown on a chart of the area. Much of the information is based on first hand experience in the areas. *Subject Headings:* **1. Ecoclimatology 2. Climatic analogs 3. Phenology 4. Ryukyu Islands.**—*M.R.*

ENVIRONMENTAL INFLUENCES

See: **City climate** (Kratzer), 8.8–15; **Climate of Lower Rhine** (Weischet), 8.8–23; **Phenology of a large town** (Franken), 8.8–148.

SYNOPTIC CLIMATOLOGY

See: **Weather in Britain, 1955** (Veryard), 8.8–142.

MISCELLANEOUS

COSMIC INFLUENCES

See also: **Solar eclipse effects on ionosphere** (Minnis), 8.8–193; **Rainfall-meteor shower relationships** (Ramage), 8.8–270; special bibliography on **Meteors and Zodiacal Light, p. 1109.**

8.8–299 551.590.22:551.524.33(421)

Satow, C. P., **Climatic change.** *Weather*, 12(5):167–168, May **1957. DWB**—Maximum temperatures at Kew plotted weekly against internal lunar ocean waves at Borneo showed Kew warmer in 377 wks after moon is on equator and colder in 349. Difference is greatest when moon is on equator at perigee and least when extreme declination is at perigee. *Subject Headings:* **1. Lunar influences 2. Temperature variations 3. Kew, Eng.**—*C.E.P.B.*

VISIBILITY

See also: **Atmos. optics** (Dietze), 8.8–13; **Visibility meters** (Bibby), 8.8–165.

8.8–300 551.591.1

Hunt, R. W. G. and Hopkinson, R. G., **Light energy and brightness sensation.** *Nature*, London, 179(4568):1026–1027, May 18, **1957.** 13 refs. **DWB**—Hunt quotes number N of physiological response functions as related to luminance L by $N=kL^{\frac{1}{3}}$ for dark adaptation and $N=kL^{p}(p=1/3)$ for light adaptation, in agreement with Hopkinson's results (*Nature*, 178(4541):1065–1066, Nov. 10, **1956**; *see* 8.2–295, Feb. 1957, *MAB*). Hopkinson discusses this agreement. *Subject Headings:* **1. Visibility of lights 2. Visibility theory.**—*C.E.P.B.*

8.8–301 551.591.1

Vos, J. J.; Lazet, A. and Bouman, M. A. (*both, Research Inst. for Perception, Nat. Defense Res. Council TNO, Soesterberg, Netherlands*), **Visual contrast thresholds in practical problems.** *Optical Society of America, Journal*, 46(12):1065–1068, Dec. **1956.** 9 figs., foot-ref. **DWB, DLC**—Contrast Thresholds—measured with dots and Landolt rings—are given as a function of object size and brightness for 31 observers. The desirability of presenting upper and lower limiting threshold curves is pointed out. Differences with the experiments of Blackwell are discussed. The influence of training is shown to be negligible. *Subject Heading:* **1. Visibility thresholds.**—*Authors' abstract.*

OPTICAL PHENOMENA

See also: **Advances in Geophysics** (Landsberg), 8.8–1; **Atmos. optics** (Dietze), 8.8–13; **Radio star scintillation** (Dagg), 8.8–189; **Radio star scintillation** (Dagg), 8.8–190; **Atmos. turbidity** (Möller), 8.8–221.

8.8–302 551.593.12:535.2.46

Keller, Geoffrey (*Perkins Obs., Delaware, Ohio*), **Relation between the structure of stellar shadow band patterns and stellar scintillation.** *Optical Society of America, N. Y., Journal,*

45(10):845–851, Oct. 1955. 3 figs. (incl. photos), table, 13 refs., eqs. **DLC.** Also issued as Ohio. State Univ. Research Foundation, Contracts AF 19(604)-41 and AF 19(604)-964, Joint Scientific Report, No. 1, Sept. 1954. 23 p. 3 figs., table, 14 refs., 34 eqs. **DWB**—Difficulties are encountered in attempting to obtain an instantaneous picture of the pattern of stellar shadow bands seen on the surface of a telescope objective. There is a close statistical relationship between these patterns and the scintillation of the total starlight received. By observing scintillation through a diaphragm having two holes with variable separation between them one can derive the Fourier spectrum of periodicities in the shadow pattern and the autocorrelation function of the pattern. A number of patterns and associated autocorrelation functions are illustrated. Some remarks are then made on the correlation between the scintillation of close double stars and the influence of telescope aperture upon it. Finally the analysis is generalized to show how a frequency analysis of the scintillation can yield a space-time autocorrelation function. *Subject Headings:* **1. Stellar shadow band 2. Stellar scintillation.**—*Author's abstract.*

8.8–303 551.593.55:546.33

Harrison, A. W. and Jones, A. Vallance (*both, Univ. of Saskatchewan, Saskatoon*), **The intensity ratio of the *D* lines in twilight.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 95–98. 2 tables, 3 refs., eqs.) **DWB**—This paper reports the first results of a program of measurements of the intensity ratio of the sodium *D* lines occurring in twilight. Plates obtained during the months, March to Aug., for the years 1954 and 1955 give a mean value for the intensity ratio of 1.50±0.02. *Subject Headings:* **1. Sodium D line 2. Twilight phenomena.**—*Authors' abstract.*

8.8–304 551.593.55:535.33

Hunten, D. M. (*Univ. of Saskatchewan, Saskatoon*), **The interpretation of twilight measurements of sodium emission.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 183–192. 4 figs., tables, 19 refs., eqs.) **DWB**—The method previously used by the author for analyzing twilight measurements is further discussed. When approximate corrections for extinction of the scattered light are included, a small modification is needed, giving an effective screening height of about 10 km. This is entirely consistent with resonance excitation. Only by ignoring the brightening of the light towards the horizon can a screening height of 47 km be found. Self-absorption effects are discussed by assuming single scattering only. The results disagree with observation, and it is suggested that correct results should resemble those found by ignoring self-absorption altogether. *Subject Headings:* **1. Sodium emission 2. Twilight sky brightness measurements.**—*Author's abstract.*

ELECTRICAL PHENOMENA

See also: **Atmospheric radioactivity,** 8.8–7; **Radioactivity of air** (Blifford, Lockhart), 8.8–96; **Radioactive hailstones** (Blifford et al.), 8.8–97; **Radiostrontium fallout** (Campbell), 8.8–99; **Radioactive fallout** (Eisenbud, Harley), 8.8–100; **Radioactive pollution and civil defense** (Frenkiel), 8.8–101; **Radioactivity of rainwater** (King et al.), 8.8–103; **Radioactive isotopes in atmos.** (Kulp et al.), 8.8–104; **Radioactive fallout** (Machta et al.), 8.8–106; **Atmos. diffusion applied to atomic fallout** (Marciano), 8.8–107; **Radioactivity count** (Ogawara), 8.8–109; **H-bombs without fallout** (Rabinowitch), 8.8–110; **Radioactive tracers** (Sheppard), 8.8–111; **Atomic explosion effects on atmos.** (Smirnov), 8.8–112; **Radioactive fallout,** 8.8–113; **Ionization chamber** (Vittozzi), 8.8–166.

8.8–305 551.594.1(485)

Norinder, H.; Israel, H. and Siksna, R., **Das luftelektrische Potentialgefälle und der Vertikal Strom in Uppsala.** [The atmospheric electric potential gradient and air-earth current in Uppsala.] *Arkiv for Geofysik*, Stockholm, 2(6):109–138, **1954.** 40 figs., 7 tables, 30 refs. **DLC**—Both lapse rate of the potential of atmospheric electricity and the vertical current were recorded simultaneously over a year, computing the conductivity. Hourly means for each month are given for undisturbed and all days, except for the duration of precipitation (due to resulting distortions), as well as means for individual undisturbed days.

Local anomaly due to radium emanation is suspected. A detailed discussion of single cases is devoted to the effect of local meteorological conditions, such as wind, fog, snow and rain. *Subject Headings:* **1. Atmospheric electricity 2. Uppsala, Sweden.**—*A.A.*

8.8–306 551.594.11

Kalinowska-Widomska, Ewa, **La marche des variations du gradient électrique de l'atmosphère à Świder sur les résultats de l'enregistrement mené en 1930 et 1950–1952.** [Daily variations of the electric gradient of the atmosphere at Swider based on results recorded in 1930 and 1950–52.] *Acta Geophysica Polonica*, Warsaw, 3(2):49–61, **1955.** 5 figs., 2 tables, 4 refs. Polish summary p. 60–61. **DWB, DLC**—The main point of the study was the determination of daily and annual variations of potential gradient at Swider. Another problem was the tying up of the annual gradient variations with variations of the basic meteorological elements, as pressure, temperature and humidity. The third problem was an attempt at statistical determination of the type of weather during the reversal of the electric field. *Subject Headings:* **1. Diurnal potential gradient variations 2. Swider, Poland.**—*A.M.P.*

8.8–307 551.594.11:551.506.1

*Oporto, Portugal. Universidade. Instituto Geofisico, **Observações do campo eléctrico da atmosfera, 1955.** [Observations of the atmospheric electric field, 1955.] V. N. de Gaia, Portugal, **1956.** unpaged. Mostly tables. **DWB**—Hourly values for each day of the year are presented in 13 large folded tables, with monthly and seasonal, as well as yearly averages for each hour, and a graphical presentation of the diurnal curves for each season and for the year for 1955, and comparative data for 1953, 1954 and 1955, for Serra do Pilar at Vila Nova de Gaia, 41°8′N, 8°36′W, elev. 96.5 m. Values given are + or − potential gradient in v./m. *Subject Headings:* **1. Atmospheric potential gradient data 2. Atmospheric electricity yearbooks 3. Serra do Pilar Observatory, Portugal.**—*M.R.*

8.8–308 551.594.12:551.510.535:523.74

Mariani, F., **The electron density in the F2 layer and its correlation with the solar activity.** *Journal of Atmospheric and Terrestrial Physics*, 10(4):239–242, **1957.** 2 figs., table. **DWB**—Secular values of maximum electron density $\bar{N}$ are expressed as $N_0(1+\beta\bar{R}+\gamma\bar{A}_F)$, $N_0(1+\alpha\bar{R})$ and $N_0(1+\delta\bar{A}_F)$, $\bar{R}$=sunspot number, $\bar{A}_F$=area of hydrogen filaments. α, δ, β and γ are calculated for 18 observatories. Results show asymmetry of δ and γ in N. and S. Hemispheres, cause of which is discussed. *Subject Headings:* **1. Electron density 2. F2 layer 3. Solar activity.**—*C.E.P.B.*

8.8–309 551.594.221

Clarence, N. D. and Malan, D. J., **Preliminary discharge processes in lightning flashes to ground.** *Royal Meteorological Society, Quarterly Journal*, 83(356):161–172, April **1957.** 5 figs., 2 tables, 23 refs., eq. **DWB**—Electrical breakdown processes in and below a thundercloud before the first return stroke of a flash to ground were studied at Johannesburg. By making observations at different distances (5, 50 and 500 km) it has been possible to separate electrostatic, induction and radiation components. Three stages are recognized, breakdown B, intermediate I and leader L. Methods of recording are described and typical records shown and discussed. B reverses with distance and is identified with a discharge between a main negative center at 3.6 km and a positive center at 1.4 km, starting from either. In I the conducting channel is being negatively charged. The nature of the preliminary discharges is discussed. *Subject Heading:* **1. Lightning discharges.**—*C.E.P.B.*

8.8–310 551.594.221

Khastgir, S. R. (*Banaras Hindu Univ., Banaras, India*), **The recombination theory of the stepped leader stroke of the lightning discharge.** *Journal of Scientific and Industrial Research, Sec. B*, New Delhi, 14(9):480–481, Sept. **1955.** 6 refs. **DLC, DWB**—A short note with references on recent theories developed for the leader stroke of the lightning mechanism. Discrepancies between theory and observations still have to be explained. *Subject Headings:* **1. Lightning theory 2. Leader lightning stroke.**—*A.A.*

AURORAS

See also: **Polar and trop. aurorae** (Paton), 8.8–39; **Radio echoes from auroras** (Forsyth, Vogan), 8.8–126; **Auroral res. during IGY** (Stoffregen), 8.8–38; **Radio echoes from auroras** (Forsyth, Vogan), 8.8–126.

8.8–311 551.521.67:551.594.51:550.385

Petukhov, V. A. (*Geophysical Inst., Academy of Sciences, Moscow*), **Solar neutron ejection as the cause of aurorae and magnetic storms.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 254–261. table, 11 refs., 3 eqs.) **DWB**—It is suggested that the incoming stream causing auroras and magnetic storms consist initially of neutrons ejected from the sun, the neutrons decaying into protons and electrons during their passage to the earth. The consequences of the suggestion are discussed in detail. *Subject Headings:* **1. Solar neutrons 2. Auroral particles 3. Magnetic storms.**—*Author's abstract.*

8.8–312 551.594.51

Seaton, M. J. (*Inst. d'Astrophysique, Paris*), **The calculation of cross-sections for excitation of forbidden atomic lines by electron impact.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 289–301. fig., 6 tables, 12 refs., 30 eqs.) **DWB**—The paper outlines the methods used, summarizes the results obtained, and discusses their probable accuracy. *Subject Heading:* **1. Auroral energy excitation mechanism.**—*Author's abstract.*

8.8–313 551.594.51:546.17

Stewart, D. T. (*Physics Dept., Queen's Univ., Belfast*), **Electron excitation functions of N_2+ bands.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 282–286. 2 figs. (incl. photo), ref., eqs.) **DWB**—The optical excitation functions of some N_2+ bands have been determined. The maximum of intensity of the Meinel bands $(A^2X-X^2\Sigma_g+)$ occurs at 60 V, while that of the first negative bands $(B^2\Sigma_u+-X^2\Sigma_g+)$ occurs at 95 V. *Subject Heading:* **1. Auroral nitrogen bands.**—*Author's abstract.*

8.8–314 551.594.52(267)

McInnes, B., **Auroral display observed from unusually low geomagnetic latitudes.** *Meteorological Magazine*, London, 86(1018):114–117, April **1957.** fig., 2 refs. **DWB**—Observations of aurora from ships in S. Indian Ocean (geomagnetic coordinates 43°S 184°E and 37°S 129°E) on Sept. 8, 1956, are described. There was a world-wide magnetic storm, radio effects, etc. *Subject Headings:* **1. Low latitude auroras 2. Indian Ocean.**—*C.E.P.B.*

8.8–315 551.594.53:523.746

Gleissberg, W., **Vorläufige Bestimmung der mittleren Länge des 80jährigen Sonnenfleckenzyklus.** [Preliminary determination of the mean length of the 80-year sunspot cycle.] *Naturwissenschaften*, 42(14):410, July 15, **1955.** table, 4 refs. **DWB**—From close correlation between frequency of sunspots and aurora the length of the 80-year sunspot cycle since 290 A.D. is estimated to have varied from 5–11 sunspot cycles, mean 7.1 ± 0.3. Taking the mean length of the sunspot cycle as 11.1 years, the mean length of the 80-year cycle is 78.8 years. *Subject Headings:* **1. Sunspot cycles 2. Auroral periodicities.**—*C.E.P.B.*

SFERICS

8.8–316 551.594.6:551.515.4

Chandrashekhar Aiya, S. V.; Khot, C. G.; Phadke, K. R. and Sane, C. K. (*all, College of Engineering, Poona*), **Tropical thunderstorms as noise radiators.** *Journal of Scientific and Industrial Research, Sec. B*, New Delhi, 14(8):361–376, Aug. **1955.** 11 figs., table, 8 refs., eqs. **DWB, DLC**—Tropical thunderstorms are characterized mainly by lightning within clouds. Atmospherics result in the range 1–20 Mc/s. The range 1–10 Mc/s is investigated. Noises are classified according to acoustical effect, in loudspeaker. The evaluation is made difficult by the movement of thunderstorms. Three types of noise phenomena during thunderstorms are distinguished, depending on time of occurrence and intensity of growth and decay.

Frequency during different seasons is given. Thunderstorms over the sea seem to originate different noise characteristics. *Subject Headings:* **1. Sferics 2. Tropical thunderstorms 3. Poona, India.**—*A.A.*

8.8–317 551.594.6

Taylor, W. L., **Description of recording equipment to be used in the study of whistling atmospherics.** *U. S. National Bureau of Standards, NBS Report,* No. 3559, Nov. 30, 1955. 25 p. 9 figs. **DWB**—The discovery, nature and cause of whistlers (atmospherics that bounce back and forth from opposite hemispheres along magnetic lines of force via the ionosphere) are reviewed and equipment designed by the National Bureau of Standards for use in a project which they are setting up to verify Storey's theory (by installations in Bermuda and the Falkland Islands), described and illustrated. Simultaneous recordings will be made for a 3-5 min period every 30 min for 12–24 hrs, two or three times a week. Magnetic tapes will be analyzed at Stanford University. *Subject Headings:* **1. Whistling atmospherics 2. Whistler recorders 3. Whistler stations 4. Falkland Islands 5. Bermuda.**—*M.R.*

RADAR METEOROLOGY

See: **Radar hail warnings** (Roncali), 8.8–127; **Radar thunderstorm obs.** (Mitra), 8.8–128; **Radar precip. echoes** (Gupta et al.), 8.8–130.

ACOUSTICAL PHENOMENA

8.8–318 551.596.1:534:662.2:539.1

Reed, Jack W. (*Sandia Corp., Albuquerque, N. M.*), **Weather determines blast prediction for atom tests.** *Weatherwise,* Boston, 9(6):202–204, Dec. **1956.** fig., photo. **DWB**—The mechanisms which produce damaging shock waves at a distance from a blast (such as created heavy damage to plaster and windows in Las Vegas, Nev. 80 mi. from point of an atom bomb explosion in 1951) are outlined and illustrated. Reflection from surface inversions, strong upper winds, or from the ozonosphere inversion are among the factors discussed. The tests in question produced reflections which hit the earth at 27, 54 and 81 mi, etc. from the NTS. Pilot explosions 2 hrs before a test recorded on a network of microbarographs, are now used to anticipate dangerous conditions. Actual explosion records are also studied for future use. *Subject Headings:* **1. Acoustical waves 2. Shock waves 3. Anomalous sound propagation 4. Atom bomb tests 5. Las Vegas, Nev.**—*M.R.*

PART II. COMPILATION OF RECENT LITERATURE ON METEORS AND ZODIACAL LIGHT

By: *Mary L. Rice*

INTRODUCTION

Investigation of meteors, popularly known as shooting stars, has claimed the attention of astronomers for centuries. As early as 1798 Brandes and Benzenberg began to compute the heights and positions of meteors.

The meteorologist has become interested in this phenomena more recently as a source of increased knowledge of the upper atmosphere. With the development of the radio technique of studying meteor ionization, this interest has increased. This technique is a powerful method for determining meteor characteristics and hence for obtaining of upper atmospheric data. A study of meteors has its practical side, too. Meteoric particles and dust are distinct hazards for operation of manned or unmanned vehicles (such as the earth satellite) at high altitudes. On the other hand, ionized meteor trails may prove useful as reflectors for long distance radio communication.

In order to give meteorologists a sample of the most recent literature on the subject of meteors and zodiacal light we have organized the unpublished abstracts in our files and added a few representative earlier papers and several comprehensive reviews published previously in *MAB*.

To make the compilation more useful, without repeating items previously run in *MAB*, the most important items on each special subject have been referred to in brackets in the detailed **Subject Outline** which follows.

This compilation does not cover the field exhaustively or even selectively. However, a historical suvery may be secured by consulting the bibliographies in *items* 8H–19, 8H–21, 8H–31 and 8H–61, and the special bibliography on **Acoustical propagation** in the Oct. 1950 issue of *MAB*, especially *see* Lindemann and Dobson, 1922; Whipple, 1930 and Whipple, 1934 (J–15, J–42 and J–61, respectively).

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1929

8H–1 523.51

Maris, H. B., **Theory of meteors.** *Terrestrial Magnetism and Atmospheric Electricity,* 34:309 **1929. DLC**—The energy of impact between a molecule of atmospheric nitrogen and a meteor moving at the rate of 4×10^6 cm/sec is sufficient to vaporize 56 molecules of iron from the solid state to a gas at 3000°K, or is equal to the energy of an electron dropped through about 200 volts. It is

assumed that the result would be a miniature explosion, which would drive from 10 to 100 molecules out of the main mass of the meteor. The energy of the average meteor is observed to be dissipated within roughly 1.5 sec after entering the upper atmosphere. As the resistance of the air to the solid mass of the meteor can account for only about 1% of the total energy loss, and radiation from the surface of the meteor for less than 1% of the total radiation, most of the energy of the meteor is dissipated and changed to radiant energy by the high energy atoms and molecules which escape from the meteor and communicate their energy to the air by collision with air molecules. The meteor flashes into view when the energy of molecules escaping from it is sufficient to support the radiation of the trail. Impacts between air-molecules in the path of the meteor and escaping molecules prevent an increase in brilliancy as the meteor moves from the height of appearance to denser strata of air. At a height of about 60 to 80 km a compressed air-cap is formed in front of the meteor, which prevents further direct impacts between the meteor and stationary air-molecules. *Subject Heading:* **1. Meteor theories.**—*Author's abstract.*

1930–1937

8H–2 523.51

Shapley, H.; Öpik, E. J. and Boothroyd, S. L., **Arizona Expedition for the study of meteors.** *National Academy of Sciences, Proceedings*, 18:16–23, Jan. **1932. DLC.** Also: Öpik, E. J. and Boothroyd, S. L., **Arizona expedition for study of meteors. Parts II–V.** *Harvard Univ. Observatory Circular*, No. 388 to 391, **1934. DLC, NN**—In Pt. 1 the methods and aims of this expedition were set forth, and its results are now discussed. About 22,000 meteors were recorded between Oct. 1931 and July 1933, and a list of 279 radiants is given, which are shown to be real. From observations of velocities made with the specially designed "rocking mirror" apparatus it appears that hyperbolic velocities are rather common among naked-eye meteors, and very frequent among those observed telescopically. Velocities up to 200 km/sec have been observed, and the percentage of high velocity meteors increases with decreasing brightness. For Oct. and Nov. 1931, practically all members of group radiants belonged to our solar system, and practically all sporadic meteors were of interstellar origin. *Subject Headings:* **1. Meteor velocities 2. Visual observation of meteors 3. Arizona Expedition, 1931–1933 4. Arizona.**—*Physics Abstracts.*

8H–3 523.51

Fisher, W. J., **Mass and velocity of meteorites and the air density along their luminous paths.** *Harvard Univ. Observatory, Circular*, No. 385, 16 p. **1934. DLC, NN**—Previous theories are discussed. It is then assumed that the rate of loss of mass at any moment is proportional to the rate of loss of kinetic energy at that moment due to loss of velocity, i.e., $dm/dt = \mathrm{km}/H\{d(1/2v^2)/dt\}$, where H is the total heat of fusion, m and v the momentary solid mass and velocity (in km/sec), respectively, and k and c constants, whence by integration and assuming 1 as the velocity at which melting ceases, $m = m_0 e^{k(1-v_0^2)/2H}$, v_0 being the initial velocity of the meteorite. Meteorites are generally oriented and their paths straight, though occasionally helical. A formula for the relation between velocities, masses and air densities along the ablation path is then deduced, but involving two indeterminable constants. It is concluded that resistance of the air practically destroys the cosmical velocity of the meteorite, so that its velocity on reaching the earth is merely that of a falling body; and that the explosions that occur in some cases are due to differential pressure of the air on different portions of the meteorite, the larger portions then naturally travelling further horizontally. *Subject Headings:* **1. Meteorite velocities 2. Meteor mass.**—*Physics Abstracts.*

8H–4 523.5:77

Millman, P. M., **Meteor photography.** *Royal Astronomical Society of Canada, Journal*, 31:295–310, **1937. DLC**—The best type of lens for photographing meteors is one giving a field of some 30° to 40° dia. in good focus, such as Zeiss Tessar or Voightlander Skopar, of aperture ratio F/4.5 and focal lengths of from 4″ to 10″. Plates, not films, should be used. A fixed camera is better than one driven. More important than direct meteor photography is that of the meteor spectra, since these reveal not only the substance of the meteors, but also atmospheric conditions at heights from 25 to 100 mi up. This needs in addition to the direct photographic lens, a prism rather larger than it with a refracting angle of about 30°. Advice is given on the focusing of the spectra, and on the adjustment of the camera to the thin edge of the prism; diagrams and plates are also given. *Subject Heading:* **1. Meteor photography.**—*Physics Abstracts.*

1941–1943

8H–5 551.594.12:551.590.25

Pierce, J. A., **A note on ionization by meteors.** *Physical Review*, 59(8):625–626, April 15, **1941.** fig., 7 refs., eqs. **DLC**—Experimental evidence of atmospheric ionization by meteoric bombardment is presented and may be useful in studying diffusion and recombination in the upper atmosphere and

in counting meteors in the daytime or in cloudy weather. *Subject Heading:* **1. Meteor ionization.**—*Author's abstract.*

8H–6 523.51

Plummer, H. C., **Heights and velocities of meteors.** *Royal Astronomical Society, Monthly Notices*, 101:2, 76–83, **1941. DLC**—The relative merits of the arithmetic and the harmonic mean for the heights of meteors are discussed. The seasonal variation in the heights of meteors at points in their observed paths is submitted to harmonic analysis. The corresponding number of observations is analyzed in the same way. It is found that the monthly numbers are closely correlated with the corresponding mean heights. When the general monthly rate of meteors is analyzed the result does not differ greatly from that obtained after the shower meteors have been excluded. This persistence in the distribution of meteoric nodes suggests a pervading structure of the whole system. The distribution of meteoric velocities is considered. The occurrence of hyperbolic velocities is inferred from DENNING's determinations no less than from recent observations. Stress is laid on the value and importance of the visual observation of meteors. *Subject Headings:* **1. Seasonal variation in meteor height 2. Meteor velocities.**—*Physics Abstracts.*

8H–7 551.510.3:523.5

Whipple, F. L., **Meteors and the earth's atmosphere.** *Reviews of Modern Physics*, 15(1):246–264, Oct. **1943.** 5 figs., 10 tables, 30 foot-refs., 33 eqs. **DLC**—Observational data on 17 photographic meteors and 433 visual meteors are used in formulas derived for the atmospheric density ρ at 4 points along each trail: near the beginning, at max. light, at the end, and at any point where the retardation is measurable. Systematic deviations between the 4 methods are generally <0.1 in log ρ, and probable errors of a single determination range from ± 0.12 to ± 0.21 in log ρ. The height/density curve suggests a flat temperature max. of 375°K near 60 km, a rapid drop to 250°K near 80 km and a constant or slowly rising temperature up to 110 km. A seasonal effect is deduced corresponding to a general rise of 5.3 ± 1.0 km of the upper atmosphere at midsummer as compared with its midwinter height. *Subject Heading:* **1. Meteor observation of atmospheric density.**—*Physics Abstracts.*

1948–1949

8H–8 523.531:551.501.81

Clegg, J. A., **Determination of meteor radiants by observation of radio echoes from meteor trails.** *Philosophical Magazine*, 39:577–94, Aug. **1948. DLC**—The variation with time of the rate of occurrence and the ranges of the radio echoes from meteor trails as the radiant moves across the heavens is explained and the ranges are estimated for any position of the radiant. Theoretical estimates agree well with experiment. With a horizontally narrow beam directed at sufficiently low elevation the ranges attain a sharp max. when the azimuth of the radiant differs from that of the beam by 90°. This is the basis of a method of radiant determination which may be used for finding unknown radiant positions. The accuracy depends on the echo rate, the declination of the radiant and the width and elevation of the aerial beam. Probable errors are $\pm 2°$ in r. a. and $\pm 3°$ in dec. *Subject Headings:* **1. Radio echoes from meteor trails 2. Radiant determination.**—*Physics Abstracts.*

8H–9 552.6

†*Henderson, E. P. and Perry, S. H., **The Drum Mountains, Utah, meteorite.** *Smithsonian Miscellaneous Collections*, Wash., D. C., 110(12), Sept. 3, **1948.** 7 p. 5 plates, 2 tables, 2 refs. **DLC**—Description and analysis of a nickel-ion meteorite weighing 1164 lb found in 39½°N 112°54′W in 1944. There was no crater or distortion so it probably fell in loose soil or snow. *Subject Headings:* **1. Meteorites 2. Drum Mountains, Utah.**—*C.E.P.B.*

8H–10 550.590.25:551.501.81

Lovell, A. C. B. and Clegg, J. A., **Characteristics of radio echoes from meteor trails: The intensity of the radio reflections and electron density in the trails.** *Physical Society of London, Proceedings*, 60:491–498, May, **1948. DLC**—Formulas are derived for the intensity of the radio wave scattered from a meteor trail on the assumption that the electrons are created in a long narrow column, of small diameter compared with the wavelength of the radio wave. Experimental work is described which shows that the predicted variation of received power with wavelength is correct for the wavelength range 4.2 m to 8.3 m, and according to preliminary results down to 1.4 m. The formulas can then be used to measure the electron density in the trails of meteors. Of particular interest are the measurements for meteors which are also observed visually. The results show that the density in the trail of a 5th-magnitude meteor (on the limit of naked eye visibility) is approximately 2×10^{10} electrons/cm path. Brighter meteors ($\sim$magnitude $+1$) produce 10^{12} electrons/cm path. These results are in good agreement with theoretical calculations. The theory is compared with earlier calculations. *Subject Headings:* **1. Radio echoes from meteor trails 2. Electron density of meteor trails.**—*Physics Abstracts.*

8H–11 523.531:538.566:551.501.81

Davies, J. G. and Ellyett, C. D., **The diffraction of radio waves from meteor trails and the measurement of meteor velocities.** *Philosophical Magazine*, 40:614–26, June, **1949. DLC**—Automatic equipment, using pulse technique, is described for photographic recording of the reflected amplitude of the radio waves in time intervals of the order of milliseconds. The theory of the diffraction effect is considered. Fluctuations in reflected amplitude should occur as a meteor crosses the region of the perpendicular from the observing station. Experiments indicate that the initial amplitude fluctuations are associated with many meteor echoes and possess the correct ratios of zone durations predicted by the diffraction theory. The times taken to traverse specified zones are measured so a method is available for measuring directly the velocity of individual meteors. The velocities of meteors in the Geminid shower of 1947, Dec. 11–14, were measured, and the results agree with photographic and visual measurements. *Subject Headings:* **1. Meteor velocity measurement 2. Radio wave diffraction.**—*Physics Abstracts.*

8H–12 523.5:551.510.535:551.501.81

McKinley, D. W. R. and Millman, P. M., **A phenomenological theory of radar echoes from meteors.** *Institute of Radio Engineers, Proceedings*, 37:364 75, April **1949. DLC**—Combined visual, photographic and radar observations are summarized and general conclusions drawn. The radar echoes are classified into basic types according to their appearances on a range-time display. These types include echoes indicating approach, or recession, or both. Other observed features are: durations up to several min, complex structure for brighter meteors, and delays in the appearance of echoes. A phenomenological theory is proposed, involving a number of postulates concerning an M-region in the upper atmosphere. Kinetic energy and u.v. mechanisms are suggested to account for the ionization produced. In the M-region are visualized striae, or patches, which form a fine structure such that within them the physical properties of the atmosphere emphasize the creation and maintenance of meteor ionization. A qualitative explanation of all the observed echo forms is advanced on this hypothesis, and results on other wave lengths are consistent with it. *Subject Headings:* **1. Radar echoes from the meteors 2. Radar echo theory.**—*Physics Abstracts.*

1951

8H–13 523.59:551.521.14

Colorado. University. Upper Air Laboratory, **The Zodiacal Light Eclipse Project.** Contract W19-122ac-9, Special Report, No. 4, Vol. 1, Oct. 31, **1951.** 33 p. 12 figs., 15 refs., 8 eqs. **DWB**—A theory that the zodiacal glow is a result of the reflection of sun light from small meteoric particles, rather than light scattered from particles or electrons from interplanetary or earth sources is expounded. Studies of light reflected from meteoric surfaces, etc., lead to conclusion that good agreement between observed and predicted curves can be obtained by this theory, with assumptions regarding kind and distribution of material, polarization, etc. Values of albedo of various stony materials, tables and curves, predicted values, etc. are included. Work done on an eclipse camera for photographic zodiacal light from a plane so as to reveal intensities and polarization at various angles is described and illustrated. *Subject Headings:* **1. Zodiacal light theories 2. Eclipse photography 3. Albedo of meteoric dust. I. Pietenpol, William Brasser.**—*M.R.*

8H–14 523.5

Cook, M. A.; Eyring, H. and Thomas, R. N., **The physical theory of meteors, Pt. 1, A reaction rate of mass loss in meteors.** *Astrophysical Journal*, 113(3):475–481, May **1951.** 8 refs., table, 17 eqs. **DLC**—The generalized reaction-rate theory is applied to the rate of mass loss in meteors. Temperatures around 3100°K are found for meteor *surfaces* near the point of maximum luminosity. An additional resistance term arises owing to this mass loss, with a v^3 dependence, which doubles the resistance computed from the usual expression at velocities about 60 km/sec. Some comment on the mechanism of flaring is offered. *Subject Headings:* **1. Meteor theories 2. Ablation.**—*Authors' abstract.*

8H–15 523.5

Thomas, Richard N. and Whipple, Fred L., **The physical theory of meteors, Pt. 2, Astroballistic heat transfer.** *Astrophysical Journal*, 114(3):448–465, Nov. **1951.** 3 tables, 29 foot-refs., 21 eqs. **DLC**—Previous difficulty in formulating a quantitative physical theory of meteors has in large part originated from the wide gap between terrestrial experiments and meteor observations. The physical theory of meteors falls into three aspects: air resistance, heat transfer, and radiation. This paper summarizes an attempt to analyze the heat-transfer aspect from the standpoint of the available meteor data and of some recent laboratory experiments. The section that relates to the laboratory experiments represents the first published attempt to measure heat transfer to bodies in free flight when the velocity is so high that ablation occurs—thus defining the astroballistic region. The free-flight heat transfer in the astroballistic region appears from these experiments to vary with

velocity and air density according to the meteor formula rather than according to the conventiona aerodynamic formulae established at lower velocities. The heat-transfer efficiency, expressed i terms of that for a Newtonian putty ball, is about 1% in the region near 1–2 km/sec. The meteo results show considerable scatter in values of the heat-transfer efficiency, with no obvious dependenc upon the velocity or air density and with a favored estimate lying near 5%. A possible interpretatio of the scatter of meteor values lies in the fragmenting and flaring of meteors; and the great importanc of further study on this point is emphasized. Some considerations on the maximum-sized meteorit capable of surviving intact lead to an independent gross estimate of the heat-transfer efficiency An attempt is made to interpret the deep pitting observed in some meteorites in terms of enhance ablation on an initially irregular surface, in accordance with some additional free-flight experiment *Subject Headings:* **1. Meteor theories 2. Heat transfer theory.**—*Authors' abstract.*

8H–16 551.510.5:551.590.2

†Whipple, Fred L., **Meteors as probes of the upper atmosphere.** (In: **Compendium of meteor ology.** Boston, American Meteorological Society, **1951.** p. 356–365. 3 figs., table, 95 refs 7 eqs.) **DWB**—A thorough exposition of every possible aspect of meteor study which could appl to meteorology. The article begins with a history of such study, origin of meteoric bodies, definitio of terms and limits of velocity of meteor fall, chemical composition as determined by spectra indicate temperatures, fragmentation in atmosphere or flaring due to crumbling. Visual methods of observin height by triangulation were begun in 1798. Later, LINDEMANN and DOBSON used data to determin temperature, density, high level wind drift and turbulence. Height varies from night to day an lower daytime levels are attended by lower average wind speeds. Photographic studies made sinc 1893 at Yale and more recently at Harvard are used to develop theories which enable computatio of air density

$$P_0 = -\frac{2^{\frac{1}{3}} V_0'}{\gamma A \tau_0^{\frac{1}{3}} V^2} \left[\int_{t_0}^{\infty} (I/V^3) dt \right]^{\frac{1}{3}}$$

when mass, rate of mass loss, luminosity, acceleration and drag coefficient are first calculated Errors arise from assumption that drag coefficient γ is constant with respect to velocity and density These errors will be greatest at great altitudes where γ is large. Comparison with NACA standar atmosphere shows marked similarity (although both curves are anchored to same base at 50–60 km and NACA atmosphere derives in part from same data). Residuals show strong seasonal correlatio and correlation with surface temperatures but not with fronts, declination of sun or sunspot numbe Advances will come from modern radio meteor observation techniques, although there are limitation even to this method. Increased observational accuracy, laboratory studies on the drag and hea transfer coefficients, and study of the physical and chemical nature of meteorites will also contribut to progress. Difference between two methods of radio observation; the pulse packet and the con tinuous transmission (Doppler) method is explained. Contains an excellent bibliography, especiall for early material. (*Same item as* 4.1–15, Jan. 1953, *MAB.*) *Subject Headings:* **1. Atmospheri structure 2. Meteor observation of upper atmosphere 3. Radio observation of meteors 4. Com pendium articles.**—*M.R.*

1952

8H–17 523.

Almond, M.; Davies, J. G. and Lovell, A. C. B., **The velocity distribution of sporadic meteors Pt. 1.** *Royal Astronomical Society, Monthly Notices,* 111(6):585–608, **1951.** 8 tables, 12 figs. foot-refs., eqs. **Pt. 2,** *Ibid.,* 112(1):21–39, **1952.** 7 tables, 7 figs., foot-refs., eq. **DLC**—The radi diffraction technique was used to measure the velocities of sporadic meteors. The velocity distribu tion measured during three separate experiments, made between 1948 and 1950, are compared wit theoretical distributions. There is no evidence for a significant hyperbolic velocity component There is no change in velocity distribution with meteor magnitude down to the fifth magnitude Fainter meteors were studied in Pt. 2. The results are similar. A fuller discussion of magnitud range is given and it is concluded that the majority of meteors in these new experiments were probabl in the magnitude range 6.0 to 7.5. *Subject Headings:* **1. Sporadic meteors 2. Meteor velocit distribution.**—*From authors' abstracts.*

8H–18 523.5

Donitch, Nicolas, **Observations de la lumière zodiacale au cours des hivers 1946–1947 e 1947–1948 à Tamanrasset (Hoggar).** [Observations of zodiacal light during the winters 1946–4 and 1947–48 at Tamanrasset (Hoggar).] *Académie des Sciences, Paris, Comptes Rendus,* 235(6):412 Aug. 11, **1952.** ref. **DWB**—The author obtained several photographs of zodiacal light from whic 24 were selected for determining the position in space of the source of the light. After briefl discussing the evidence deduced from his photographs, the author suggests that zodiacal light form a ring around the sun which closes up with the sun's surface and extends beyond the orbit of th

arth. The distaff shape of zodiacal light appears to confirm this hypothesis. *Subject Headings:* **Zodiacal light 2. Tamanrasset, Algeria.**—*G.T.*

8H–19 551,510.42:551.590.25:016

†Hoffleit, Ellen Dorit, **Bibliography on meteoritic dust with brief abstracts, including compilation y the late Willard J. Fisher.** Harvard Univ. Harvard College Observatory, Contract NOrd 0449, Task I and Contract N5ori-07647, Technical Report, No. 9, **1952.** 45 p. 505 refs. Also ssued as its *Harvard Reprints*, V. 2, No. 43. **DWB**—This annotated bibliography contains 505 eferences to articles on meteoric dust in its historical, observational, theoretical and instrumental spects (including some related material on auroras, noctilucent clouds, etc.) all arranged alphabetcally by senior author. The basis of the bibliography was a card catalog of 125 abstracts on meteoric ust prepared by WILLARD J. FISHER before his death in 1934. This material was extended by earching a number of standard journals or bibliographic sources, mostly astronomical. Not all of he items were checked against the original. (*Same item as* 6B–121, Feb. 1956, *MAB.*) *Subject leadings:* **1. Meteoric dust bibliographies. I. Fisher, Willard J. II. Whipple, F. L.**—*M.R.*

8H–20 551.510.536 523.59

Karimov, M. G., **O prirode protivosiianiia.** [The nature of the counterglow.] *Astronomicheskiĭ hurnal*, Moscow, 29(6):633–637, **1952.** 2 tables, 6 refs. **DLC**—In order to verify the correctness f the implication of FESENKOV and others that the counterglow is of a gaseous nature and that the arth has a gaseous tail like a comet, the counterglow was photographed by the author at the Astrohysical Observatory near Alma Ata in 1949 and 1950. He used a spectrograph equipped with a chmidt camera of light-gathering power F:1 and a mirror optical system, on Isopan ISS high-ensitive film, with a 355 hr exposure. Author explains the method of evaluating the counterglow pectrogram and of further analysis of the extent to which the night sky lines are intensified in the ounterglow luminescence which is approximately 14% for the red and blue lines and 22% for the ellow. This intensification is small, but it establishes the nature of the counterglow as gaseous. he chemical composition of the gas is nitrogen plus oxygen. Finally, the author points out that ntensification of night sky emission lines in zodiacal light indicates that the terrestrial atmosphere, n its upper levels, extends out along the plane of the ecliptic and that there is a gaseous efflux from he earth as well as from comets. English translation in Hope, E. R. (*ed.*), **The earth's exterior tmosphere and the counterglow.** 2nd ed. **1954** (*see* 6.5–8, May 1955, *MAB*). *Subject Headings:* **Counterglow 2. Gaseous tail of earth's atmosphere.**—*A.M.P.*

8H–21 551.590.25

†Mitra, Sisir K., **Meteoric phenomena.** (In his: **The upper atmosphere.** 2nd ed. Calcutta, he Asiatic Society [preface **1952**]. p. 75–118. 21 figs., 2 tables, 57 refs. (p. 645–647), 35 eqs. **DWB**—In this chapter MITRA discusses first the classification and composition of meteors. This s followed by sections on meteor observation (visual and photographic) and meteor theories (parcularly those of LINDEMANN and DOBSON, SPARROW, and ÖPIK). The remainder of the chapter eals with the radio echo (or radar) method of observing meteors. An excellent bibliography, overing the literature from 1923, is included. *Subject Headings:* **1. Meteor theories 2. Radar neteor observation 3. Meteor bibliographies.**—*M.L.R.*

8H–22 523.59

Rense, W. A. (*Univ. of Colorado*), **The origin of zodiacal light.** *Astrophysical Journal*, 115(3): 01–505, May **1952.** 4 figs., 10 refs., 3 eqs. **DWB, DLC**—On the assumption that the zodiacal low is caused by reflection from stony and metallic particles which make up an interplanetary cloud, whose density falls off inversely with distance from the sun, predicted values of polarization and ntensity variations along the glow are made. Diffuse-reflection studies of laboratory specimens of neteoritic surfaces were utilized. The results compare favorably with available observations of the low. *Subject Heading:* **1. Zodiacal light.**—*Author's abstract.*

8H–23 523.5

Thomas, Richard N., **The physical theory of meteors, Pt. 3, Conditions at the meteor surface.** *strophysical Journal*, 116(1):203–210, July **1952.** 10 foot-refs., 3 tables, 16 eqs. **DLC**—The onditions at the meteor surface are investigated. It is concluded that the conventional linearized eat-transfer equation cannot be applied to determine the surface temperature of meteors. On the asis of the reaction-rate approach, it is concluded either that the meteor surface vaporizes in all ases or that, if melting occurs, the droplets are so small as to require energies equal to some 50% f the vaporization energy to separate them from the meteor surface. *Subject Heading:* **1. Meteor heories.**—*Author's abstract.*

1953

8H–24 523.

Behr, A. and Siedentopf, H., **Untersuchungen über Zodiakallicht und Gegenschein nach lic elektrischen Messungen auf dem Jungfraujoch.** [Investigations into zodiacal light and count glow from electric photometer measurements on Jungfraujoch.] *Zeitschrift für Astrophysik*, 32(19–50, **1953.** 20 figs., 7 tables, 31 refs., 17 eqs. **DLC.** Also their: **Zur Struktur des Zodiakallich** [On the structure of the zodiacal light.] *Experientia*, 9(4):134–135, Apr. 15, **1953.** 2 figs. Engl summary p. 135. **DLC**—Photometric apparatus for measuring zodiacal light is described. Measu ments with blue and yellow filters in Feb. and March 1952, corrected for starlight, are shown isophots. The polarized part of the zodiacal light, attributed to free electrons concentrated n the sun, forms an ellipse with 2–1 axes, nearly symmetrical about ecliptic; the unpolarized pa attributed to dust particles, is asymmetric but brightest near ecliptic. Counterglow is an area nearly uniform illumination equal to about 30 stars of 10th magnitude per sq. degree; it is attribut to a concentration of particles. The second article is a summary of the first one. *Subject Headin* **1. Counterglow 2. Zodiacal light 3. Jungfraujoch, Switzerland.**—*C.E.P.B.*

8H–25 551.590.25:551.577.

Bowen, E. G., **The influence of meteoritic dust on rainfall.** *Australian Journal of Physi* Melbourne, 6(4):490–497, Dec. **1953.** 5 figs., 2 tables, 6 refs. **MH-BH.** Also: Cleminshaw, C. I **La meteorítica y la meteorología.** [Meteoritics and meteorology.] *Revista Meteorológica del Pe* Lima, 2(3):25–28, Oct./Dec. **1956.** 3 tables. Spanish version of Bowen's article (trans. fr original English in *The Griffith Observer*, June **1954**). **DWB**—An examination of daily avera rainfall for Sydney, Australia for (a) 1859–1901 and (b) 1902–1944, and comparable data fr British Indies and elsewhere, leads the author to advance the hypothesis that the source of anomal rainfall peaks on or about the 12–13, 23 and 31 of Jan. is extraterrestrial since the effect is worldwi The fact that these peaks occur about 29 days after the meteor showers of Dec. 13–14, 22 and Jan leads him to believe that these showers of meteoric dust are responsible. (*Same item as* 6F–2 June 1955, *MAB.*) *Subject Headings:* **1. Meteoric dust effects on rainfall 2. Bowen hypothe 3. Sydney, Australia.**—*M.R.*

8H–26 551.501.81:551.590.

Brown, Ian C. and Kaiser, T. R. (*both, Jodrell Bank Exp. Station, Manchester Univ.*), **The rad echo from the head of meteor trails.** *Journal of Atmospheric and Terrestrial Physics*, Londo 4(1/2):1–4, **1953.** 2 figs., table, 7 refs., eqs. **DWB**—A theoretical account in terms of famili diffraction theory is offered in explanation of a type of radio echo, apparently originating at t moving head of a meteor trail, which is sometimes observed in addition to the well-known specula reflected echo. No assumptions are invoked beyond those commonly accepted as necessary explain the specularly reflected echo. The theory predicts intensities of head echoes in agreeme with observation, and also predicts that the intensity of the head echo relative to that of the spec larly reflected echo should be proportional to the radio wavelength and inversely proportional to t difference in range between the two echoes. It is suggested that other anomalous meteor echo may arise from discontinuities associated with visual flares. *Subject Headings:* **1. Radio echoes fr meteors 2. Meteoric head echo.**—*Authors' abstract.*

8H–27 551.510.3:551.510.53:52.

Ceplecha, Zd., **Meteor photographs, Pt. 1, Air densities.** *Bulletin of the Astronomical Institu of Czechoslovakia*, Prague, 4(3):55–60, **1953.** 4 figs., 3 tables, 4 refs., 2 eqs. Russian summa p. 59–60. **Pt. 2, The photographed breakage of Meteor 131a.** *Ibid.*, 4(5):113–119, **1953.** 4 fig 2 tables, 4 refs., 6 eqs. Russian summary p. 118–119. Also: Link, F., **Sondages météoriques de haute atmosphère.** [Meteoric soundings of the upper atmosphere.] *Ibid.*, 4(6):168–170, 19 2 figs., 3 refs., 7 eqs. Russian summary p. 170. **DLC.** Also: Link, F., **Scale height in the ior sphere deduced from meteors.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Pre **1955.** p. 78. 2 refs.) **DWB**—Paper 1: From 14 double photographs taken in 1951, velociti decelerations, sizes and heights of meteors are determined. From these data the author calcula (according to a mathematical method of analysis developed in this paper) atmospheric densit between 60 and 100 km. Results of the calculation are tabulated and graphically presented. Pt of the paper contains calculations in connection with various factors involved in the breakage o meteor, such as geometrical conditions, luminous phenomena, pressure on the front part, etc. increase of atmospheric density at the height of breakage (around 60 km) is suggested as one possi explanation of the phenomenon.—Link reconsiders the photographic material used by Ceplecha a derives his own atmospheric density model in agreement with results obtained at Harvard. He a finds that between 80 and 100 km temperature appears to be decreasing with lower latitude. T note in **Meteors** is a discussion of the results of Ceplecha and Link. *Subject Headings:* **1. Up**

tmosphere density 2. Meteoric exploration of atmosphere 3. Ionospheric height determinations.—*G.T.*

8H–28 621.396.8:522(02)

†Chechik, P. O., **Radiotekhnika i elektronika v astronomii.** [Radiotechnique and electronics n astronomy.] Moscow, Gosenergoizdat, **1953.** 103 p. 76 figs., 22 tables, foot-refs., bibliog. 38 refs.) p. 102–103. *Massovaia Radiobiblioteka*, No. 189. **DLC** (QB475.C45)—This small echnical text contains chapters on various aspects of time (or longitude) on earth and its radio issemination or determination; on meteors and their study by radio; on lunar, solar and galactic nvestigations by radio, on the significance and application of photoelements in astronomy and their neasurement. The effect of the ionosphere, ionospheric winds, solar influences in magnetic field of arth and radio frequency radiation from sun and space are all treated. All references are to Soviet terature. *Subject Headings:* **1. Radio astronomy textbooks 2. Radio meteor observation.**—*M.R.*

8H–29 523.5

†Jacchia, Luigi G. and Wright, Frances W. (*trans.*) (*Harvard Coll. Obs.*), **Russian research on neteors and meteorites carried out in U.S.S.R. for the two years, October 1950–October 1952 (not ncluding Czechoslovakia, Poland, etc.). 1953.** 2 p. Mimeo.—Notes on texts and other works n meteors published in U.S.S.R. recently and circulation of each of 8 works (12,000 to 60,000 copies). Conferences are also mentioned. *Subject Headings:* **1. Meteor research in U.S.S.R. 2. U.S.S.R.**—*M.R.*

8H–30 523.53

Joint Commission on High Altitude Research Stations. *International Union of Geodesy and Geophysics, Bulletin d'Information*, 2(2):380–383, April **1953.** 3 tables. **DWB**—The problem of World Days is discussed in relation to the desirability of having them at times of meteor showers. Coordination with the WMO and the Association of Meteorology of the I.U.G.G. is also indicated. *Subject Headings:* **1. Meteor showers 2. Synoptic observation.**—*M.R.*

8H–31 551.510.53:551.590.25

†Kaiser, T. R. (*Univ. of Manchester*), **Radio echo studies of meteor ionization.** *Advances in Physics*, London, 2(8):495–544, Oct. **1953.** 25 figs., refs. p. 543–544, eqs. **DLC**—In this comprehensive review article numerous aspects of the quantitative investigation of the physical properties of the upper atmosphere by 4 to 10 m radio reflections from meteors and meteor trails are discussed theoretically and empirically, and the results of a large amount of original investigation made at Jodrell Bank, Eng., and never before published, incorporated therein. The theory of meteor ionization and dissipation of these ions; the theory of scattering of radio waves from meteor trails and experimental data on this subject; the estimation of ionospheric winds from fading echoes; recombination and attachment in meteor trails; correlation with visual meteors; theory of meteor height distribution and properties of the upper atmosphere as determined from the meteor flight distribution; determination of constants used in meteor ionization equations, theory of radio echo rate, mass distribution of incident meteors; radio echo rate as function of equipment parameters, distribution of radio echo durations, total incident flux and space density of meteors and total ionization produced by meteors constitute the subject matter of the various chapters. Numerous graphs and curves show the actual and theoretical relationships involved in all of these phases of meteor research. Comparisons are made with rocket and meteor data obtained in the U. S. and Australia. It is concluded that the incident flux of sporadic meteors is sufficient to maintain a continuous ionospheric layer from 130 down to 115 km below which ionization will be distributed in patches becoming fewer with decreasing height. (*Same item as* 5.5–6, May 1954, *MAB.*) *Subject Headings:* **1. Meteor ionization trails 2. Radio echo meteor soundings 3. Upper atmosphere physics 4. Ionosphere models.**—*M.R.*

8H–32 551.501.81:551.590.25

McKinley, D. W. R., **Effect of radar sensitivity on meteor echo durations.** *Canadian Journal of Physics*, 31(5):758–767, July **1953.** 5 figs., 2 tables, 9 refs., 9 eqs. **DWB**—Meteor echo durations were observed simultaneously with two radar systems having a power sensitivity ratio of 33 db. An experimental relation between echo duration and system sensitivity is obtained which shows that the duration of meteor echoes varies slowly, but significantly, with system parameters. Curves are furnished to correct observed durations to zenithal durations, applicable to any system using a horizontal half-wave dipole antenna. *Subject Headings:* **1. Radar meteor echoes 2. Meteor echo duration.**—*Author's abstract.*

8H–33 551.501.81:523.5

McKinley, D. W. R., **Meteor echo duration and radio wave length.** *Canadian Journal of Physics*, 31(7):1121–1135, Nov. **1953.** 5 figs., 7 tables, 8 refs. **DWB**—The duration of radar

echoes from meteors has been observed simultaneously on 9.22 m and 5.35 m, and also on 9.22 and 2.83 m. The ratio of durations on two wave lengths decreases with increasing duration by factor of two over the observed range, deviating significantly from the accepted square law of wav length. Plotting the log of the ratio against the log of the duration yields two straight lines different slopes, one in the short-duration range and the other applying to the longer echoes. Gener empirical formulas are developed to predict the echo duration on one radio equipment in terms of tl duration of the same echo recorded by another apparatus of different sensitivity and wave lengt *Subject Headings:* **1. Radar echoes from meteors 2. Meteor echo duration.**—*Author's abstract.*

8H–34 523.59:523.7

Rense, Wm. A.; Jackson, James M. and Todd, Barbara (*Dept. of Physics, Univ. of Colorad Boulder*), **Measurements of the inner zodiacal light during the total solar eclipse of February 2: 1952.** *Journal of Geophysical Research*, Washington, D. C., 58(3):369–376, Sept. **1953.** 3 figs 2 tables, 8 eqs. Also: Colorado. University. Upper Air Laboratory, **The zodiacal light eclips project.** Contract W19-122ac-9, Special Report, No. 4, Vol. 2, Oct. 31, **1952.** 16 p. 2 table 4 figs., foot-refs. **DWB**—Photographs of the skylight in the vicinity of the eclipsed sun were take during the total eclipse of Feb. 25, 1952, at a point in the shadow path near the Red Sea in Sau Arabia at an altitude of 32,000 ft. A photometric analysis of the photographs yielded informatio about the intensities and degree of polarization of the zodiacal glow between 5°.5 and 13° from tl sun. The data are consistent with the planetary dust-cloud theory of the origin of the light, an tie in previous observations of the glow beyond 30° of the sun with those of the solar corona withi 3° of the sun. *Subject Headings:* **1. Zodiacal light 2. Solar eclipses.**—*Authors' abstract.*

8H–35 523.5

†Runge, Richard J., **A report on the zodiacal light.** New Mexico University. Dept. of Physic Contract AF 19(604)-181, Scientific Report, No. 1, [**1953?**] 22 p. 7 figs., 31 refs., eqs. **DWB**– Previous studies on the zodiacal light are reviewed critically in the following order: 1) Photometr measurements; 2) Spectroscopic analysis; 3) Measurements of polarization of zodiacal ligh 4) Visual observations; 5) Theories (terrestrial, meteoric and solar); 6) Theoretical procedure The "Gegenschein" is also considered. The author concludes that none of the theoretical explan tions of the zodiacal light can be accepted with any confidence, because of lack of verifying dat *Subject Headings:* **1. Zodiacal light 2. Counterglow.**—*M.R.*

8H–36 523.5

Siedentopf, H.; Behr, A. and Elsässer, H., **Photoelectric observations of the zodiacal ligh** *Nature*, London, 171(4363):1066–1067, June 13, **1953.** fig., 4 refs. **DWB**—Isolines of density fc electrons and dust particles are plotted in a plane perpendicular to the ecliptic, derived from observe values of brightness and polarization of zodiacal light. Electron density of 600/cm³ near earth orbit gives gas density of 10^{-21} gm/cm³; density of dust 10^{-23}. If counterglow is due to a cloud dust particles near outer libration point of sun-earth system, this cloud has a density 30 times highe *Subject Heading:* **1. Zodiacal light.**—*C.E.P.B.*

8H–37 523.

Thomas, Richard N. (*Harvard Coll. Obs.*) and White, William C. (*U. S. Naval Ordnance Te Station, Inyokern, Calif.*), **The physical theory of meteors, Pt. 4, Inquiry into the radiation problem– a laboratory model.** *Astrophysical Journal*, Chicago, 118(3):555–567, Nov. **1953.** 2 tables, 2 refs., 24 eqs. **DLC**—The similarity in atomic spectrum between meteor and artificial meteor (ultra speed pellet) is discussed. The meteor is equivalent to a mono-energetic atomic beam; the pelle to a high-temperature furnace in a highly transient and probably nonequilibrium state. Th excitation mechanism is probably atom-atom inelastic collision in both cases. A consideration c the pellet molecular spectrum strengthens these conclusions. The pellet molecular spectrum appear to provide information on diffusion processes in the wake. Present spectrophotometric data o both meteor and pellet are very incomplete. *Subject Heading:* **1. Meteor theories.**—*Authors' abstrac*

8H–38 523.5:551.501.8

Wells, H. W. (*Dept. of Terrestrial Magnetism, Carnegie Inst. of Washington*), **Radio interferomete technique applied to measurement of meteor velocities.** *Journal of Geophysical Research*, 58(2):284 286, June **1953.** 2 figs., foot-refs. **DWB**—A technique is outlined for measuring meteor velocitie and path length by the interferometer method, using continuous wave rather than pulsed system Signals are sent from Cedar Rapids, Iowa and received at Washington, D. C., on a frequency of 49. Mc. When one antenna was used, no interference pattern was evident on the polar diagram, bu when two antennas were connected a characteristic Z occurred on the record of one of the lobes as meteor passed over a null-point and sometimes 2 successive Z's were noted. *Subject Heading* **1. Meteor velocity measurements 2. Radio interferometer technique 3. Cedar Rapids, Iowa.**– *M.R.*

1954

8H–39 523.51

Cook, Allan F., **The physical theory of meteors, Pt. 6, The light curve.** *Astrophysical Journal*, 120(3):572–577, Nov. **1954.** fig., refs., 32 eqs. **DLC**—The conventional theory for predicting the light curve of a meteor is applied to a bright meteor photographed with the Super-Schmidt cameras of the Harvard Meteor Expedition and is shown to be inadequate over the faint early portion of the trail, the meteor being fainter than predicted. An improved theory, based on the reaction-zone model and including thermal radiation from the body, provides a completely satisfactory fit to the observed light curve. *Subject Heading:* **1. Meteor theories.**—*Author's abstract.*

8H–40 523.5:551.596.1

Dubin, M. (*G.R.D., Cambridge, Mass.*), **Meteor impacts by acoustical techniques.** (In: Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W. (*eds.*), **Rocket exploration of the upper atmosphere.** London, Pergamon Press, **1954.** p. 26–27. fig.) **DWB**—Two methods have been used to detect meteorites encountered by rockets in the upper atmosphere: 1) by examination of pits on a polished metal plate, and 2) by counting pips or pulses of short duration on a microphone record (a method devised by J. L. Bohn of Temple Univ.). On the V-2 Blossom IV D flight, 66 pips were detected between 90 and 150 km (70 to 214 sec), and on IV G, 14 pips between 90 and 150 km. The rates were 1 in 2.2 sec. and 1 in 6 sec. respectively, agreeing with Whipple's 1946 estimate of 0.9 meteorite collision per sq ft per sec. *Subject Heading:* **1. Acoustical detection of meteorites.**—*M.R.*

8H–41 523.59

Elsässer, Hans, **Die räumliche Verteilung der Zodiakallichtmaterie.** [The space distribution of zodiacal light material.] *Zeitschrift für Astrophysik*, 33(4):274–285, **1954.** 4 figs., 5 tables, 7 refs., 10 eqs. **DLC**—From measurements by Behr and Siedentopf (8H–24) of brightness and polarization of zodiacal light, the distribution of zodiacal material about the plane of the ecliptic is calculated. The surfaces of equal electron density in interplanetary space can be represented by rotation ellipsoids of uniform flattening, the axis of rotation passing through the center of the sun normal to the ecliptic. The distribution of the material with increasing distance from the ecliptic is "bell-shaped" but not symmetrical. *Subject Heading:* **1. Zodiacal light.**—*C.E.P.B.*

8H–42 551.590.25:523.59

Kallman, H. K., **Quantitative estimate of frequency and mass distribution of dust particles causing the zodiacal light effect.** *Rand Corporation, Santa Monica, Calif.*, [*Papers*], P-542, June 28, **1954.** Rev. Aug. 31, 1954. 17 p. 4 figs., 13 refs., 20 eqs. **DWB.** Also in: *Société Royale des Sciences de Liège, Mémoires*, 15:100–113, **1955.**—This report consists of a technical discussion of the daily amount of meteoric dust in the earth's atmosphere, the size of the particles and the relation thereof to the dust reproducing the zodiacal light. Estimates are made from visual and from radar data. A great discrepancy exists between the results for meteor and those for zodiacal "dust," which can only partly be resolved by changing assumptions regarding the zodiacal dust. *Subject Headings:* **1. Meteoric dust theory of zodiacal light 2. Zodiacal light theories.**—*M.R.*

8H–43 551.593.9:523.5

Link, F. and Linková, Z. (*both, Astronom. Inst., Ondrejov*), **Agrandissement de l'ombre terrestre pendant les éclipses de lune, Pt. 1, Influences météoriques.** [Increase of the earth's shadow during lunar eclipses, Pt. 1, Meteoric influences.] *Bulletin of the Astronomical Institutes of Czechoslovakia*, Prague, 5(4):82–84, July 1, **1954.** fig., table, 14 refs. Russian summary p. 83–84. **DLC**—Increases in the earth's shadow during 57 lunar eclipses observed from 1802 to 1950 are tabulated. The annual variation of increase in the earth's shadow is graphically presented and compared with annual meteoric activity values, showing a qualitative agreement between the two phenomena. *Subject Heading:* **1. Meteor-earth's shadow relationships.**—*G.T.*

8H–44 523.53

*Malcheva-Popova, M. and Bonov, Angel D., **Meteorniiat potok Perseidi prez 1953 g.** [The Perseid meteor shower of 1953.] *Bulgarska Akademiia na Naukite, Sofia, Izvestiia, Otdelenie za Fiziko-Matematicheski i Tekhnicheski Nauk, Seriia Fizicheska*, 4:269–291, **1954.** 3 figs., 6 tables. Russian and French summaries p. 290–291. **DLC**—Tables and graphs give results and analysis of 515 meteors observed during 1953 at Sofia. 315 were during the Perseid shower. *Subject Headings:* **1. Meteor showers 2. Sofia, Bulgaria.**—*M.R.*

8H–45 551.501.9:551.594.7:523.5

†Millman, Peter M. (*Dominion Obs., Ottawa*), **Radio observations of meteors.** *Science*, Wash., D. C., 120(3113):325–328, Aug. 27, **1954.** 3 figs., 2 tables, 21 refs. **DLC**—The development of

powerful radio equipment during the war led to a rapid increase of scientific knowledge abou meteors, which is here briefly summarized. A good linear relation derived from 900 height determina tions exists between the mean heights of meteoric ionization and the velocity of meteors (88 km a 20 km s^{-1}, 100 km at 60 km s^{-1}). The frequency distribution of 11,000 meteor velocities observe in Canada, and 3,000 in England show a remarkable agreement, with planes at 37 and 60 km/ and a mean velocity of 45 km/s. This shows that at least up to the 9th magnitude (ϕ 1 mm) th meteors are members of the solar system. Ionospheric winds up to 50 m/s in the horizontal directio and up to 10 m/s in the vertical are normal. The average horizontal drift is 25 m/s with a negligible vertical drift. Meteoric orbits are derived (1.5 to 7.2 years with a high eccentricity, 0.74 to 0.9 with a low eccentricity), and the ionospheric stratification is discussed. *Subject Headings:* **1. Radio meteor observation 2. Meteor velocities 3. Ionospheric winds.**—*A.A.*

8H–46 523.5

Roach, F. E.; Pettit, Helen B.; Tanberg-Hanssen, Einar and Davis, Dorothy N. (*U. S. Naval Ordnance Test Station, China Lake, Calif. and Inst. of Theoretical Astrophysics, Oslo, Norway*), **Observations of the zodiacal light.** *Astrophysical Journal*, 119(1):253–273, Jan. **1954.** 13 figs. 13 tables, foot-refs., eqs. **DLC, DWB**—Observations of the zodiacal light for five nights between Nov. 1952, and April 1953, are recorded. The variation of brightness in the plane of the ecliptic for elongations from the sun from 30° to 100° is given. A comparison with photometric measurements of the outer corona supports the hypothesis that the outer corona and the inner zodiacal light have a common physical origin. A study of the zodiacal light with filters centered on the upper-atmosphere emissions *O* I 5577, 6300, and *Na* I 5893 indicates (*a*) that the light has the spectral characteristics of the sun and (*b*) that there is no measurable enhancement of the nightglow in the zodiacal light. *Subject Heading:* **1. Zodiacal light.**—*Authors' abstract.*

8H–47 523.51:551.521.64

Singer, S. Fred, **The origin of meteorites.** *Scientific American*, 191(5):36–41, Nov. **1954.** figs. **DLC**—A popular review of recent findings on the origin of meteorites, the results of chemical and metallurgical studies, the effect of cosmic rays upon meteorites and on their estimated ages. Meteorites are believed to originate from the collisions of protoplanets which broke into asteroids and meteorites. These catastrophies are placed around 300 million years ago. *Subject Headings:* **1. Meteorites 2. Cosmic ray effects on meteorites.**—*I.L.D.*

8H–48 523.51

Smith, Henry J., **The physical theory of meteors, Pt. 5, The masses of meteor-flare fragments.** *Astrophysical Journal*, 119(2):438–442, March **1954.** 5 foot-refs., 3 tables, 3 eqs. **DLC**—The masses of particles contributing to meteor flares have been computed from their observed durations, by applying the classical equations of meteor ballistics. The flare masses determined in this way are of the order of 10^{-6} gm. This value is 10^{-3}–10^{-4} times smaller than the flare masses computed by Jacchia from the total light generated by the flare. It is concluded that a typical meteor flare consists of the simultaneous emission of several thousand microscopic particles rather than the fracture of the parent-body into a few larger pieces. *Subject Headings:* **1. Meteor theories 2. Meteor flare masses.**—*Author's abstract.*

8H–49 523.51

Whipple, Fred L. and Wright, Frances W., **Meteor stream-widths and radiant deviations.** *Royal Astronomical Society, Monthly Notices*, 114(2):229–231, **1954.** fig., table, 8 refs. **DWB**—Among eight showers of photographic meteors, the average deviation from the moving mean radiant increases linearly with the spatial stream-width. *Subject Heading:* **1. Meteor showers.**—*Authors' abstract.*

1955

8H–50 551.501.89:551.590.25

Banerji, R. B., **Meteor trails as reflectors of radio waves: interpretation in terms of high frequency radar.** Pennsylvania. State Univ. Ionosphere Research Laboratory, Contract AF 19(604)-1304, Scientific Report, No. 80, Dec. 15, **1955.** 51 p. 16 figs., table, 23 refs., eqs.—The theory of the formation of meteor trails is reviewed qualitatively and certain relevant quantitative features discussed. On this basis the phenomena of reflection and scattering from such trails is considered in detail. The number of meteor echoes that can be expected in a typical radar system is calculated under search and tracking conditions. The preferred direction of observation of meteor showers by a radio equipment is worked out for different showers. Echo duration and range distribution are also determined. *Subject Headings:* **1. Radar meteor observation 2. Meteor trial theory.**—*Author's abstract.*

8H–51 523.57

†Cook, Allan F. (*Harvard College Obs.*), **The nature of meteoric radiation.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 8–15. fig., 16 refs., 2 eqs.) **DWB**—The body of spectroscopic data available on meteors is surveyed and discussed. It appears that both ionization and excitation increase with velocity, and also with the ratio of meteoric particle dimension to mean free path of an atom being ablated from the particle. The atoms and ions that have been identified in meteor spectra, until the present, are HI, NI, OI, NaI, MgI, MgII, AlI, SiI, SiII, CaI, CaII, CrI, MnI, FeI, FeII, and NiI. Evidence is given for the presence of radiation from molecules of N_2 in the continuum of a spectrogram of a Perseid meteor. The apparent difference between the spectrum produced by a wake of one or more solid particles behind the meteor, and that produced by a train, is also pointed out. A brief description of the methods of absolute meteoric spectrophotometry is given, as are suggestions for future research on meteor spectra. *Subject Headings:* **1. Meteor spectra 2. Meteor temperature 3. Meteoric spectrophotometry.**—*Author's abstract.*

8H–52 523.51

Edwards, George, **Isotopic composition of meteoritic hydrogen.** *Nature*, London, 176(4472): 109–111, July 16, **1955.** 3 tables, 11 refs. **DWB**—Analyses of hydrogen in iron and carbonaceous meteorites gave deuterium-protium ratio as -8.4% compared with Lake Michigan water or -12.9% compared with average sea water. *Subject Heading:* **1. Meteorites.**—*C.E.P.B.*

8H–53 551.501.89:551.590.25

†Ellyett, C. D. and Fraser, G. J. (*both, Canterbury Univ. College, Christchurch, N. Z.*), **The influence of noise on radar meteor observations.** *Australian Journal of Physics*, Melbourne, 8(2):273–278, June **1955.** 2 figs., 18 refs., eq. **DWB, DLC**—An experimental investigation has been made of the minimum detectable echo power from meteor trails, using radar techniques at 69 Mc/s, with incoherent detection. For optimum signal-to-noise ratio the pulse width must exceed the cathode-ray tube spot width. Extraterrestrial noise is predominant at 69 Mc/s, and the receiver noise figure is found to be of only second order importance. Variations in the effective aerial temperature introduce corresponding variations in the observed meteor rate, and must therefore be considered when meteor rates are being compared. Using artificial echoes, a minimum detectable signal-to-noise ratio of 8 db is found. The most important parameter is the total received signal energy. Both these results are in agreement with published theories. No further reduction in the size of the smallest observable meteor is likely through receiver improvement. The important features of the receiver are described. *Subject Headings:* **1. Radar echoes from meteor trails 2. Radar meteor observation 3. Radar noise.**—*Authors' abstract.*

8H–54 523.553:551.501.89

Ellyett, C. D. and Roth, K. W. (*both, Canterbury Univ. College, Christchurch, N. Z.*), **Radar determination of meteor showers in the Southern Hemisphere.** *Australian Journal of Physics*, Melbourne, 8(3):390–401, Sept. **1955.** 5 figs., 2 tables, 15 refs. **DWB**—During the greater part of 1953 a radar survey was made of meteor activity in the Southern Hemisphere. The results are presented, together with a brief description of the apparatus used. Radiants are calculated from daily range-time plots of meteor echoes, and the resulting showers are in accord with data reduced from earlier visual observations. Both radar and visual data for the Southern Hemisphere show many night radiants between mid June and mid-Aug. Showers in this period are clearly defined but overlap in date, and there is a marked drift in the direction of the meteor activity as the date progresses. Two new Southern Hemisphere daylight showers of moderate strength have been found by radar in June and Oct. respectively, and considerable confused night activity is present in early Dec. The greater proportion of both the Northern and the Southern Hemisphere meteor shower radiants appear to lie close to the plane of the ecliptic. *Subject Headings:* **1. Meteor showers 2. Radar meteor observation.**—*Authors' abstract.*

8H–55 551.501.89:551.590.25

Ellyett, C. D. (*Canterbury Univ. College*), **Radar-meteor research in New Zealand.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 198–199. 5 refs.) **DWB**—A radar survey of Southern Hemisphere meteor activity, covering the year 1953, has been carried out at a new radio field station operated near Christchurch, New Zealand. Measurements have also been made of meteor velocities. It is proposed to repeat the survey of meteor activity during 1955–56, and also to make measurements on the D region of the ionosphere. Coherent pulse apparatus will probably be completed prior to the International Geophysical Year, enabling E region winds to be calculated from the movement of meteor trails. *Subject Headings:* **1. Radar meteor observation 2. Meteor velocity measurement 3. New Zealand.**—*Author's abstract.*

8H–56 551.510.535:551.590.25

Eshleman, R. v.; Gallagher, P. B. and Peterson, A. M. (*all, Radio Prop. Lab., Stanford Univ.*), **Continuous radar echoes from meteor ionization trails.** *Institute of Radio Engineers, N. Y., Proceedings,* 43(4):489, April **1955.** 3 refs. **DWB**—Radar propagation tests over 500 to 2000 km distances with at 30 to 100 Mc frequencies indicate continuous reflection from areas in E region, which may be explained by (1) scattering from blobs of ionization produced by turbulence, or (2) overlapping of reflections from numerous meteor ionization trails. If the former is the true explanation the maximum power would be received from overhead, whereas if meteor trails are responsible, there would be little chance of reflection from horizontal trails overhead, as these are rare, but would be at a maximum at low angles. Tests made in summer of 1953 at Stanford on 23 Mc showed no returns at vertical angle, but continuous returns on 45° angle and 140 km range. Conclusion is that meteor ionization plays dominant role in long range vhf propagation. *Subject Headings:* **1. Radar echoes from meteor trails 2. Meteor ionization trails.**—*M.R.*

8H–57 551.547:551.501.81:551.590.25

†Evans, S. (*Jodrell Bank Experimental Station, Univ. of Manchester*), **Atmospheric pressures and scale heights from radio echo observations of meteors.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 86–91. 7 figs., 21 refs., 6 eqs.) **DWB**—The distribution of heights of meteors observed on radio echo equipment has been shown to depend significantly only on the mass distribution of the incident meteors and the atmospheric scale height. At altitudes of the order of 100 km, values of the scale height are derived from the width of the height distributions and values of atmospheric pressure at the maxima of the distributions are obtained from the meteor evaporation equations. A comparison of these results with those obtained from photographic meteor and rocket observations is felt to be valid since the same parameters are required in the evaporation equations used in photographic and radio meteor theory. The present results are not significantly different from those obtained in New Mexico and geographical variations therefore appear to be small. Seasonal variations in the height of a given pressure level are of the order of ±1 km which is little greater than the probable error. Possible diurnal and semidiurnal variations both having an amplitude of the order of ±1 km have been found. *Subject Headings:* **1. Upper air pressures 2. Radio echoes from meteors.**—*Author's abstract.*

8H–58 523.5

†Fedynskiĭ, V. V. (*Meteor and Comet Commission, Astronomical Council, Academiia Nauk, SSSR*), **Meteor studies in the Soviet Union.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 188–192. 2 tables, 26 refs.) **DWB**—Meteors have been studied for 150 years by Russian astronomers, and >150 papers and 3 monographs on meteors have been published in the last 30 years. Systematic observations have been made at Stalinabad, Tadjik-Ashkhabad, Turkmenistan (38°N) where weather conditions are good for observation; and also at Odessa and Moscow, Leningrad, Gorky, Lvov, etc. on a smaller scale. Conferences are held every 2 years. Visual observations of 39,000 meteors were made by ASTAPOVITCH. Photos and spectra have been obtained since the early part of the century. Studies of meteoric effects on atmosphere, ionosphere and earth are reported. as well as studies of atmospheric effects on meteors. *Subject Headings:* **1. Meteor research in U.S.S.R. 2. U.S.S.R.**—*M.R.*

8H–59 523.531:551.501.81

Forsyth, P. A. and Vogan, E. L., **Forward-scattering of radio waves by meteor trails.** *Canadian Journal of Physics,* Ottawa, 33(5):176–188, May **1955.** 7 figs., table, 15 refs. Also: Hines, C. O., **Diurnal variations in the number of shower variations detected by the forward-scattering of radio waves, Pt. 1, Theory.** *Ibid.,* 33(9):493–503, Sept. **1955.** 8 figs., table, 5 refs., eqs. Also: Forsyth, P. A.; Hines, C. O. and Vogan, E. L., **Pt. 2, Experiment.** *Ibid.,* 33(10):600–606, Oct. **1955.** 4 figs., 5 refs. **DWB, DLC**—For abstract of first article, *see* 7.11–291, Nov. 1956, *MAB*; for second article, *see* 7.5–67, May 1956, *MAB.* In the third article the theory developed in the preceding article is applied to derive the expected diurnal variations of the meteor signal rate for four showers as observed by means of a particular forward-scatter transmission path (Cedar Rapids–Ottawa). These results are then compared with the experimental signal rates. The good agreement obtained indicates that the approximations inherent in the theory are sufficiently accurate for practical purposes. The results also indicate that very few meteors, if any, are observed under conditions which do not satisfy the requirements for specular reflections. *Subject Headings:* **1. Radio meteor observation 2. Radio echoes from meteors.**—*Author's abstract.*

8H–60 523.5

Jacchia, Luigi G. (*Harvard Coll. Obs.*), **The physical theory of meteors, Pt. 8, Fragmentation as cause of the faint-meteor anomaly.** *Astrophysical Journal,* Chicago, 121(2):521–527, March **1955.**

2 figs., 2 tables, 10 refs., 4 eqs. **DLC**—The observed decelerations and light-curves of bright meteors are in good agreement with the simple ballistic theory, while fainter meteors photographed with the Super-Schmidt cameras in New Mexico show startling anomalies. In particular, the durations of faint meteors are shorter and the decelerations increase faster than predicted by the theory, when the mass is computed from the integration of the luminous-intensity-curve, in the same fashion as for bright meteors. Extreme fragility and progressive fragmentation seem to account for these and other anomalies. The concept of pellet-like meteors must be replaced with that of a cluster of breaking fragments in the case of most smaller bodies. *Subject Headings:* **1. Meteor theories 2. Fragmentation theory of meteors.**—*Author's abstract.*

8H–61 551.510:523.51:08 551.590.25

†Kaiser, T. R. (*ed.*), **Meteors.** Special supplement (Vol. 2) to the *Journal of Atmospheric and Terrestrial Physics.* London, Pergamon Press, **1955.** 204 p. numerous bibliogs. and illus. **DWB**—A collection of 39 papers which were read at the Symposium on Meteor Physics held at Jodrell Bank Experimental Station in July 1954 on invitation of A. C. B. Lovell are printed in permanent book form. Each paper was abstracted separately and the contents were listed in Pt. III, p. 927, July 1956, *MAB.* The subjects treated include meteor ablation, luminosity, ionization, spectra, collision processes, radio echoes, masses, space density drift, zodiacal dust cloud, orbits as determined photographically or by radio, effects on ionosphere and upper air data obtained from meteors (pressure, winds, scale height). (*Same item as* 7.7–1, July 1956, *MAB.*) *Subject Headings:* **1. Meteor physics symposia 2. Ionospheric physics 3. Jodrell Bank, Eng.**—*M.R.*

8H–62 551.501.81:551.501.7

†Kaiser, T. R. and Evans, S. (*both, Jodrell Bank Exp. Station, Manchester Univ.*), **Upper atmospheric data from meteors.** *Annales de Géophysique,* Paris, 11(2):148–152, April/June **1955.** 3 figs., 19 refs. **DLC**—Photographic and radio echo soundings of meteors are analyzed to give data on scale-height, density and wind in the high atmosphere. Work on these lines in the past 10 yrs is summarized and some quantitative results given in graphic form (scale height 85–110 km, density 85–105 km, and diurnal and seasonal variations in mean height for a given meteor velocity from radio echoes). Latter data do not support large seasonal and latitude variations in atmosphere density. The photographic method is better for studies of detailed structure of atmosphere at high elevation and the radio echo method for continuous measurements of means. *Subject Headings:* **1. Upper air observations 2. Radioecho meteor soundings.**—*M.R.*

8H–63 523.5

Kallmann, H. K. (*Inst. of Geophysics. Univ. of Calif.*), **Relationship between masses and visual magnitudes of meteors.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 43–54. 10 figs., 11 refs., 15 eqs.) **DWB**—An estimate of the probable masses of meteors of different visual magnitudes and of different velocities is made. The investigation is limited to faint and very faint meteors; i.e., to particles of visual magnitudes larger than zero. The estimate is based on the relation between luminous intensity and magnitude first developed by Öpik. However, contrary to assumptions made previously in evaluating the theory, it is shown here that the luminous efficiency is a function not only of the velocity of the meteor for all magnitudes, but also of the visual magnitude or physical size of the particle itself. Furthermore, it is shown that the duration of visibility of the particle also is a function of the velocity and magnitude, and therefore cannot be assumed constant over large magnitude ranges, as has been done in the past. Because of the insufficient experimental data available at present, no claim to accuracy in the determination of meteor masses can be made. However, the analysis shows that previously estimated masses for very faint meteors are probably too large. Calculating the mass of a meteor of a given magnitude under the assumptions that the luminous efficiency is a constant for a given velocity and that the duration is a constant, results in a considerably larger estimate of the mass than if these assumptions are eliminated. The mass calculated for a meteor of +4 magnitude under the two assumptions is about twice that obtained without them. At a magnitude of +10 the difference increases by a factor of 10 to 100, depending upon the type of the shower, the velocity, and the duration-magnitude relation. A mathematical description of the luminous efficiency, τ, in terms of duration, t, is tentatively suggested:

$$\log \tau = a + b \log t.$$

From observations, the following type of relation between duration and magnitude has been obtained: $\log t = -x - ym$, where x and y are constants which differ for different velocities and types of shower, and m is the visual magnitude. Therefore, it might be deduced that t and, finally, τ are functions of velocity, density, and magnitude. *Subject Headings:* **1. Meteor luminosity 2. Meteor mass.**—*Author's abstract.*

8H–64 523.5

Levin, B. J. (*Geophysical Inst., Akademiia Nauk, SSSR*), **Physical theory of meteors and the study of the structure of the complex of meteor bodies on the basis of visual meteor observations.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 131–143. 4 tables, 10 refs., 21 eqs.) **DWB**—The dependence of meteor magnitudes upon initial masses and initial velocities of meteor bodies forms the basis of the study of their mass distribution and their spatial density. The characteristics of the steepness of the luminosity function and consequently of the mass distribution of meteor bodies are given for fourteen meteor showers. Owing to the dependence of the luminosity of meteors upon their velocity the observed frequency of showers does not characterize the density of meteor bodies in corresponding swarms. For a comparison of swarms the densities of meteor bodies, exceeding one and the same limiting mass $D(M^*)$, must be calculated. An analogic reduction to the same limiting mass is made for meteor bodies producing sporadic meteors. The spatial density of these bodies is ten times greater than that of the "central" parts of the swarms of active showers. *Subject Heading:* **1. Meteor luminosity.**—*Author's abstract.*

8H–65 551.521.3:523.51

Link, F. (*Astronomical Inst., Czechoslovak Academy of Sciences, Prague*), **Contribution of meteoritic material to the atmospheric absorption.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 79–80. 15 refs., eqs.) **DWB**—Optical measurements of atmospheric absorption, great meteor showers, time of fall measured by clearing at the zenith after and dates of heavy rains 30 days after shower activity (Bowen), oceanographic soundings, zodiacal light and direct collection of meteoric dust give various values of size distribution; those most recently obtained showing same order of magnitude agreement. *Subject Headings:* **1. Atmospheric absorption 2. Meteor showers.**—*M.R.*

8H–66 551.509.25:621.396.9

McKinley, D. W. R. (*National Res. Council, Ottawa, Canada*), **The meteoric head echo.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 65–72. 6 figs., 5 refs., eqs.) **DWB**—Two meteoric head echoes are examined in detail, and it is shown that the diffraction theory proposed by Browne and Kaiser (8H–27) does not agree with the observations. The diffraction theory is satisfactory for the fainter meteors, which do not have true head echoes, but for the bright meteors it is believed that a "moving ball" target accompanying the meteor head must be postulated to explain the observed head echoes. It is admittedly difficult to visualize physical processes which could account for this transient echo, though some tentative suggestions are put forward. *Subject Headings:* **1. Meteor echoes 2. Meteor theories.**—*Author's abstract.*

8H–67 621.396.8:523.53

McKinley, D. W. R. (*Natl. Res. Council, Canada*), **Radio determination of the orbit of the Eta Aquarid meteors.** *Astrophysical Journal*, Chic., 122(3):513–519, Nov. **1955.** 4 figs., table, 11 refs. **DWB, DLC**—From an analysis of radio-echo data obtained on May 4–5, 1949, the mean observed velocity of the η-Aquarid meteors is determined to be 64.4 km/sec, and the corrected geocentric velocity to be 64.6 km/sec. A position at R.A. 330°, Dec. 0°, is found for the η-Aquarid radiant. With these data an orbit was computed with an eccentricity of 0.83, an inclination of 157°.8, and a period of 8.0 years. Some further remarks on the δ-Aquarid shower of July, 1949, are appended, and the observed velocity is corrected to give a geocentric velocity of 40.9 km/sec for the δ-Aquarid meteors. *Subject Headings:* **1. Radio determinations of meteor orbits 2. Radio astronomy.**—*Author's abstract.*

8H–68 523.51

Öpik, E. J. (*Armagh Observatory, Northern Ireland*), **The masses and structure of meteors.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 33–35. table, 6 refs., 7 eqs.) **DWB**—Data and evidence are presented in support of the concept that visual meteorites are really dustballs of density less than that of water, instead of dense, compact bodies of iron or stone as classical theory maintained. Calculations of aerodynamic pressure and drag are given for Arizona and other meteorite measurements. *Subject Headings:* **1. Meteorite structure 2. Dustball theory of meteors.**—*M.R.*

8H–69 523.51

Plavec, Miroslav (*Astronomical Inst., Czechoslovak Acad. of Sci., Prague*), **Meteor streams at early stages of evolution.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 168–176. fig., 3 tables, 8 refs., 17 eqs.) **DWB**—Some features of the meteor streams at early stages of their evolution are investigated. It is supposed, according to Bredichin and Whipple, that the streams are formed by cometary ejections. Formulas are derived furnishing the deviations, due to the ejections, of the orbital elements of the meteors from those of the parental comet. It is

shown that for ejection velocities between 10^1 and 10^3 m/sec, the ejected meteors follow practically the orbit of the comet, but they are rather rapidly dispersed along the orbit. From the observed distance between the meteor cloud and the comet or from the deviation of the radiant we can estimate the age and the ejection velocity of the shower. Although the numerical results obtained by the author are only preliminary, they indicate that the γ-Draconids and the main swarm of the Leonids are very young formations and that the ejection velocity was very low—several meters per second or rather less. This result supports WHIPPLE's theory. *Subject Headings:* **1. Meteor shower origin 2. Meteor theories 3. Meteor orbits.**—*Author's abstract.*

8H–70 523.5

Radošević, M. D., **Svetleće telo u atmosferi nad Jugoslavijom, 25. oktobra 1954.** [Luminous object in the atmosphere over Yugoslavia on Oct. 25, 1954.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 4(3/4):95–100, July/Dec. **1955. DWB**—Reports details of a national survey made in Yugoslavia in connection with a luminous object widely observed over that country on Oct. 25, 1954. It is concluded that the object must have been a bolide, some 300 m in diameter, travelling at an altitude between 51 and 92 km. *Subject Headings:* **1. Meteors 2. Yugoslavia.**—*G.T.*

8H–71 523.51

Reasbeck, P. and Mayne, K. I., **The ages and origin of meteorites.** *Nature*, London, 176(4474): 186–188, July 30, **1955.** 2 tables, 17 refs. **DWB**—The results of helium and of argon-potassium age determinations are in substantial agreement. Ages of stone meteorites are of order 2×10^9 years, of iron meteorites 3×10^8. Authors suggest that meteorites were formed by the break up of a planet soon after solidification of the bulk of the iron phase. *Subject Heading:* **1. Meteorite origin.**—*C.E.P.B.*

8H–72 523.53(02)

Royal Astronomical Society of Canada, **Observer's handbook, Vol. 48, 1956.** Ed. by C. A. Chant; Ruth J. Northcott and David Dunlap. Toronto, Univ. of Toronto Press, **1955.** 83 p. figs., tables. **DWB**—Dates on meteor showers for 1956, angle of incidence and hourly rate, are given in table on p. 76 of this standard astronomical almanac. *Subject Headings:* **1. Meteor showers 2. Astronomical observers handbooks.**—*M.R.*

8H–73 546.293:523.51

Trofimov, A. V. and Rik, K. G., **Ob izotopakh meteoritnogo argona.** [Isotopes of meteoritic argon.] *Akademiia Nauk SSSR, Doklady*, 102(5):911–914, June 11, **1955.** 2 figs., 7 refs. **DLC**—The possibility of obtaining data on the age of meteorites and additional information on their life-history has developed since it became known that cosmic helium in meteorites (formed at the disintegration of their atoms by cosmic particles) consists of 30% of the rare isotope He^3. In this paper the authors present and discuss the method and results of determining the isotopic composition of argon separated from 7 meteorites. *Subject Headings:* **1. Isotope content of meteoritic argon 2. Meteorite origin 3. Helium particles.**—*A.M.P.*

8H–74 523.5:551.501.81

Weiss, A. A. (*Dept. of Physics, Univ. of Adelaide*), **Radio echo observations of meteors in the Southern Hemisphere.** *Australian Journal of Physics*, Melbourne, 8(1):148–166, March **1955.** 2 tables, 12 figs., 21 refs. **DLC**—The results of a radio survey of meteor activity at Adelaide are presented. The radiants and activities of six major meteor showers (Geminids, day-time Arietids, ζ-Perseids, δ-Aquarids, Corona Australids, Orionids) have been measured by methods which are described, and the mass distributions in three of these showers are discussed. Seasonal and diurnal variations in the background activity of sporadic meteors are examined in relation to the radiation patterns of the aerial systems. Height distributions for meteors of three showers (Geminids, day-time Arietids, ζ-Perseids) are given. Diurnal variations in the height distribution of sporadic meteors do not conform to those expected from the motion of the apex of the earth's way. *Subject Headings:* **1. Radio meteor observation 2. Meteor shower radiants 3. Adelaide, Australia.**—*Author's abstract.*

8H–75 523.5:551.501.81

Weiss, A. A. (*Dept. of Physics. Univ. of Adelaide*), **Radio-echo observations of meteors in the Southern Hemisphere.** (In: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 195–197. 2 tables, 2 refs.) **DWB**—A year of measurements of wind in the meteor region have been made at Adelaide, South Australia with equipment reported by ROBERTSON, LIDDY and ELFORD in 1953. Seasonal changes are evident at 80–100 km; the wind reverses direction from east to west at 70 km in summer and at 100 km in winter, while in spring it is E. 15 m/sec and in autumn W. 35 m/sec. A 24-hr period is found in all months, but the semidiurnal component is irregular in

amplitude and phase. *Subject Headings:* **1. Radio meteor observation 2. Meteor trail wind observation 3. Ionospheric winds 4. Adelaide, Australia.**—*M.R.*

8H–76 551.510.536:523.59

Whipple, Fred L. (*Harvard College Obs.*), **A comet model, Pt. 3, The zodiacal light.** *Astrophysical Journal*, Chicago, 121(3):750–770, May **1955.** fig., 5 tables, 40 refs., 34 eqs. Summary in: Kaiser, T. R. (*ed.*), **Meteors,** London, Pergamon Press, **1955.** p. 144. **DLC**—The Poynting-Robertson effect is shown to require about 1 ton/sec of small particles to maintain the zodiacal cloud, irrespective to particle shape, density, or dimension within the range of 10^{-4}–1.0 cm. The zodiacal cloud is assumed to be of the nature deduced by VAN DE HULST and ALLEN from their studies of the Fraunhofer corona and the zodiacal light. The probable cometary contribution to the zodiacal cloud is here considered on the basis of the icy-comet model. Some 30 tons/sec of meteoritic material contributed continuously in typical comet orbits are mostly lost by the action of the following physical forces or processes as the particles spiral inward toward the sun by the Poynting-Robertson effect: (*a*) interstellar wind, (*b*) Jupiter's random perturbations, (*c*) the Jupiter perturbational barrier, and (*d*) collisional destruction. Of these, *b* and *d* are found to be the most important. The final calculated contribution is about the required amount. Collisions among the particles appear to be largely responsible for the cutoff in zodiacal particle size above about 0.03 cm, as found by VAN DE HULST. Corpuscular radiation from the sun will simulate the Poynting-Robertson effect but will simultaneously tend to destroy the particles. No allowance for this effect is included in the calculations because of uncertainties in the numerical quantities involved. Corpuscular radiation, however, if sufficiently powerful, may exceed the Poynting-Robertson effect in importance and may also demand a larger source of material for the zodiacal cloud. If so, the corpuscular radiation will also increase the critical cutoff dimension. *Subject Headings:* **1. Zodiacal cloud 2. Poynting-Robertson effect 3. Corpuscular radiation.**—*Author's abstract.*

8H–77 551.590.25:551.594.12

Whipple, Fred L., (*Harvard Coll. Obs.*), **The physical theory of meteors, Pt. 7, On meteor luminosity and ionization.** *Astrophysical Journal*, Chicago, 121(1):241–249, Jan. **1955.** 4 figs., 5 tables, 21 refs., 2 eqs. Summary in: Kaiser, T. R. (*ed.*), **Meteors.** London, Pergamon Press, **1955.** p. 16–17. **DWB**—The relative frequencies of occurrence of radio and bright photographic meteors suggest either (a) that the ratio of meteoric ionization to luminosity varies as $(\text{velocity})^2$ or (b) that there exists a surprising dependence of particle size upon orbital characteristics. The writer prefers the first alternative, which leads to about a $(\text{velocity})^6$ law for the ionizing efficiency per gram. An order-of-magnitude deficiency in radio meteors at velocities above 60 km/sec may well arise from a suppression of radio-velocity measures for faint meteors above an altitude of about 110 km by rapid diffusion of the ion column. Meteor ionization, like a persistent meteor train, probably also decays extremely rapidly below about 82 km. The combined effects of rapid electron diffusion at high altitude and decay at lower altitudes would reduce the slope of the mean height-velocity curve for radio meteors as compared to photographic meteors. In this manner, conflicting data concerning the efficiencies of ionization versus luminosity for meteors may be reconciled. *Subject Headings:* **1. Meteor luminosity 2. Meteor ionization trails 3. Meteor theory.**—*Author's abstract.*

1956

8H–78 532.51:551.501.81

Browne, Ian C.; Bullough, K.; Evans, S. and Kaiser, T. R., **Characteristics of radio echoes from meteor trails, Pt. 2, The distribution of meteor magnitudes and masses.** *Physical Society of London, Proceedings, Ser. B,* 69(1):83–97, Jan. **1, 1956.** 12 figs., 2 tables, 19 refs., 12 eqs. Also: Billam, E. R. and Browne, I. C., **Pt. 4, Polarization effects.** *Ibid.*, 98–113. 13 figs., 11 refs., 5 eqs. **DWB**—Pt. 1 by A. C. B. LOVELL and J. CLEGG (8H–10) appeared in 1948 and Pt. 3 by GREENHOW in 1952 (*see* 4.1–254, Jan. **1953,** *MAB*). Pt. 2 deduces the distribution of meteor magnitudes and masses from radio echo data. The ranges of magnitude which contribute most to the mass are computed for various showers. In Pt. 4 observations of polarization on 55 Mc/s are described and amplitude A of persistent echoes is related to duration I by $A\alpha T^{0.3}$. *Subject Heading:* **1. Radio meteor echoes.**—*C.E.P.B.*

8H–79 523.5:551.507.362

Dubin, Maurice (*Ionospheric Physics Lab., GRD, AF Cambridge Res. Center*), **Meteoric bombardment.** (In: Van Allen, James A. (*ed.*), **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, **1956.** p. 292–300. 3 figs., table, 12 refs.) **DWB, DLD**(?)—An experiment for the detection of meteoric particles entering the earth's atmosphere is proposed for a projected earth satellite. A brief review of the research on meteors is made to point out the advantages of measurements made from a satellite. Such measurements would be of scientific importance in determining the role of interplanetary particles as related to the geophysics of the atmosphere, the structure of the ionosphere,

sporadic E, noctilucent clouds, airglow, etc. Meteoric particles colliding with the satellite may also constitute a hazard affecting the reliability of other scientific experiments. A method for measuring the influx of meteoric particles into the earth's atmosphere, based on the detection of the acoustical energy generated upon impacts, is described. This technique is reviewed with respect to feasibility, reliability, and sensitivity. Results from V-2 and Aerobee rocket firings using this approach are also presented. The acoustical method for the detection of meteoric particles seems promising as a means of expanding our knowledge of the mass and density of interplanetary matter, and is therefore recommended as a satellite experiment. *Subject Headings:* **1. Satellite observation of meteors 2. Acoustical detection of meteoric particles.**—*Author's abstract.*

8H–80 551.510.53

Kosibowa, Stefania (*Univ. of Wrocław*), **O badaniach wyższych warstw atmosfery ziemskiej.** [Studies of the upper layers of the earth's atmosphere.] *Przegląd Geofizyczny*, Warsaw, 1(1):67–76, **1956.** 3 figs., table, 8 refs. **DLC**—A detailed survey of achievements in the study of upper air layers made by world scientists. The author takes up successively the questions of the D, E, F1 and F2 layers, atmospheric, solar and lunar tides, the ionosphere, iridescent clouds, meteors, the phenomena of twilight and night luminscence of the sky, aurora borealis, etc. *Subject Headings:* **1. Upper atmosphere 2. F layers 3. Ionospheric tides. 4. Meteors.**—*A.M.P.*

8H–81 551.510.535:551.594.7

†Little, C. G.; Rayton, W. M. and Roof, R. B., **Review of ionospheric effects at VHF and UHF.** *Institute of Radio Engineers, N. Y., Proceedings*, 44(8):992–1018, Aug. **1956.** 2 tables, 182 refs. 3+eqs. **DLC**—This paper summarizes the present-day knowledge of ionospheric effects at VHF and UHF, with the exception of forward scattering of vhf radio waves by the ionosphere. The seven effects covered in the paper are: Radar echoes from aurora, Radar echoes from meteors, The Faraday effect and Radar echoes from the moon, Radio noise of auroral origin, Absorption of radio waves by the ionosphere, Refraction of radio waves by the ionosphere, and the Scintillation of the radio stars. Each ionospheric effect has in turn been divided into separate subtopics, and the main results are given in these subsections, with particular emphasis upon providing references to the original papers. In this way the reader wishing to know the answer to a specific problem will speedily be able to find a summary of the main published results in the field, and also be able to learn which papers deal with the particular topic of interest. *Subject Headings:* **1. Ionospheric reflection of VHF and UHF 2. Radar echoes from auroras 3. Ionospheric refraction 4. Ionospheric absorption 5. Scintillation of radio stars 6. Radar meteor echoes.**—*Authors' abstract.*

8H–82 551.583:523.51

Link, Frantisek, **Změny klimatu a sluneční činnosti v posledních čtyřech tisíciletích.** [Climatic changes and solar activity during the last four milleniums.] *Československá Akademie Věd, Prague, Rozpravy*, 66(2), **1956.** 51 p. 17 figs., 6 tables, 26 refs., 11 eqs. Russian and French summaries p. 46–51. **DLC**—Information on conditions of cloudiness at night is derived from records of meteor observations since 2300 B.C. A 400-yr periodicity is discernible in these data. Auroral observations since the first century also show this periodicity, indicating variations of solar activity. Temperature being inversely proportionate to cloudiness, an extrapolation of the secular fluctuation of cloudiness at night suggests the probability of a cloudiness increase and temperature decrease toward the end of the century. *Subject Headings:* **1. Climatic changes 2. Meteor observation.**—*G.T.*

8H–83 551.501.81:523.51

McKinley, D. W. R., **Some factors affecting the radio determination of meteoric velocities.** *Naturwissenschaften*, Berlin, 43(10):221–222, May 15, **1956.** 6 refs. **DWB**—The discrepancy between radio and visual determinations of meteor velocities is discussed. Deceleration along the path prior to the point of radio measurement may be important in slow meteors. *Subject Headings:* **1. Radio echoes from meteor trails 2. Meteor velocities.**—*C.E.P.B.*

8H–84 551.501.81:523.51

Messages by meteor trails. *Science*, Wash., D. C., 124(3215):258–259, Aug. 10, **1956.** **DLC**—Messages may be transmitted over long distances by using the frequently observed trails of single meteors in the ionosphere (about 60 mi high), according to P. A. Forsyth of the Radio Physics Laboratory near Ottawa. The work of Project "Janet," which has just been declassified, is described. Signals have been transmitted for up to 1000 mi using frequencies in the TV range. Messages are stored in an "electronic brain" which releases them whenever a meteor trail comes between the two communicating points, but at such a high speed that they must be stored electronically and released slowly for teletype printing. This method opens up a whole new band for transmission, and is free from interference by aurora. *Subject Headings:* **1. Meteor trail radio transmission 2. Canada. I. Forsyth, P. A.**—*M.R.*

8H–85 551.590.25:621.396.

Pugh, Robert E., **The number density of meteor trails observable by the forward-scattering o radio waves.** *Canadian Journal of Physics*, Ottawa, 34(10):997–1004, Oct. **1956.** 3 figs., 5 refs., 2 eqs. **DWB, DLC**—The number of meteor trails which can be detected by the forward-scattering o radio waves varies with the region of the sky under observation. The number density is determine theoretically, as a function of position relative to the transmitter and receiver. *Subject Heading* **1. Radio meteor trail observation.**—*Author's abstract.*

8H–86 523.59:535.242:551.510.53

Roach, F. E. and Rees, M. H. (*Boulder Labs. Nat. Bureau of Standards*), **The absolute photometr of the Gegenschein.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, 1956 p. 142–155. 6 figs., 5 tables, 15 refs., eqs.) **DWB**—A photoelectric photometer of the type used in airglow observations has been applied to the study of the gegenschein and zodiacal light. The par of the zodiacal cloud studied is that outside the earth's orbit. The conclusions reached on the basi of the observations are that the gegenschein and the adjacent zodiacal light are due to separate an distinct concentrations of particles, and that the part of the zodiacal cloud investigated is at the dis tance of about one astronomical unit from the earth, or between the orbits of Jupiter and Mars. Th observed spotty nature of the zodiacal cloud indicates local concentrations of particles. *Subjec Headings:* **1. Counterglow 2. Zodiacal light 3. Photoelectric photometry.**—*Authors' abstract.*

8H–87 546.291:523.5

Singer, S. Fred (*Maryland Univ. Physics Dept.*), **A crucial experiment concerning the origin o meteorites.** *Maryland. Univ. Dept. of Physics. Technical Report*, No. 47, July **1956.** 4 p. 10 refs **DWB**—It is suggested that the He^3:He^4 ratio of iron meteorites be measured after the samples have been heated. It is anticipated that the ratio will be greater than in corresponding unheated samples Results of such experiments are of importance in dating the break-up of the meteorite's parent plane as well as for estimating the value of the prehistoric cosmic ray flux. *Subject Heading:* **1. Meteoriti helium.**—*Author's abstract.*

8H–88 523.5:551.507.36:629.19

*Singer, S. F. (*Maryland. Univ. Physics Dept.*), **The effect of meteoric particles on a satellite** *Jet Propulsion*, N. Y., 26(12):1071–1075,1087,1090. 3 tables, fig., 20 refs. 3 eqs. Dec. **1956.** Also issued as *Maryland. Univ. Physics Dept., Technical Report*, No. 41, May **1956.** 16 p. 3 tables, 20 refs., 4 eqs. **DWB**—Cosmic rays have very high velocities, very small mass and great penetrating power but do not give up much energy on penetrating a metallic skin such as on a satellite. Meteors on the other hand, have relatively large mass, low speeds, and give up all of their energy on impact as they have little penetrating power. The energy of a meteor, nevertheless, is very great even compared with C.R's. A table gives the latest information on the mass, energy and penetration power (in terms of cm of aluminum) of various sizes of meteors (from .0046 to .46 cm radius), being of the order of 0.11 to 10.9 cm of aluminum. Discussion of hazard is based mostly on work of Öpik Whipple and Grimminger. The eroding and corroding power of meteoroids is thoroughly discussed *Subject Headings:* **1. Meteor penetration of satellites 2. Meteor energies 3. Satellites.**—*M.R.*

8H–89 551.501.81:551.594.12:551.590.25

Villard, O. G., Jr.; Peterson, A. M.; Manning, L. A. and Eshleman, R.v. (*all, Radio Propagation Lab., Stanford Univ.*), **Some properties of oblique radio reflections from meteor ionization trails** *Journal of Geophysical Research*, Wash., D. C. 61(2, Pt. 1):233–249, June **1956.** 8 figs., 5 tables, 9 refs., 3 eqs. **DLC**—Certain characteristics of radio signals, propagated by reflection from meteor ionization trails from a low-power continuous-wave transmitter 960 km distant, were studied at radio frequencies of 23.2, 46.4, and 92.8 Mc. In particular, the percent of the total time that meteor reflections were detectable at each frequency is presented, and shown to be in qualitative agreement with theoretical expectations. Simultaneous recordings were also made of signals from a second remote transmitter operated at 23.1, 46.2, and 92.4 Mc, and located at various distances along, and at right-angles to, the propagation path. From the percent time that signals received from the second transmitter were coincident with those from the first, it is concluded that reradiation from the numerous, low-density trails is highly directional, and that the fading, long-enduring echoes from the relatively-infrequent, high-density trails are considerably less directional. When the transmitters were spaced in a direction perpendicular to the propagation path, the signal coincidence decreased much more rapidly with transmitter spacing than when the transmitters were spaced along the propagation path. *Subject Headings:* **1. Radio reflections from meteor trails 2. Meteor ionization trails.**—*Authors' abstract.*

8H–90 551.501.81:551.594.12:551.590.25

Wirth, H. J., **Preliminary observations of forward scattering of electro-magnetic waves b meteor trails.** *U. S. Navy Electronics Laboratory, San Diego, Calif., Research Report*, No. 690, May

p, 1956. 8 p. 11 figs., table, 3 foot-refs. **DWB**—This report covers a statistical analysis of preliminary data on meteoric ionization scatter obtained with very-high-frequency amplitude-modulated transmissions over a California path from Palo Alto to San Diego. In general, the data agreed with theoretical predictions. *Subject Headings:* **1. Electromagnetic wave scattering by meteors 2. Electromagnetic effects.**—*Author's abstract.*

8H–91 551.501.81:551.594.12:551.590.25

Wisbar, Herward, **Wellenstreuung und meteoride Einflusse auf kurzen und den benachbarten ultrakurzen Wellen.** [Wave distribution and meteorite effects on short and very short waves.] *Archiv der Elektrischen Ubertragung*, Stuttgart, 10(8):343–352, Aug. **1956.** 12 figs., table, 16 refs. German and English summaries p. 343. **DLC**—A long technical discussion of scatter-waves due to residual ionization, at medium (500–2000 km) and very great (4000–11,000 km) distances, probably due to meteor ionization. The influence of grazing frequencies and results of observations in 40–70 m/Hz range, long enduring meteor echoes, atmospheric and trophospheric influences at 40–70 m/Hz, effects of an ionospheric disturbance or auroral storm, and commerical applications for radio, telegraph and telephone circuits, are discussed and illustrated with schematic diagrams and synoptic charts. *Subject Headings:* **1. Scatter wave propagation 2. Meteor ionization 3. Inversion effects on VHF propagation.**—*M.R.*

1957

8H–92 523.5(08) 551.590.25:621.396.9

Bombardment of the earth by meteors. *Nature*, London, 179(4551):121–124, Jan. 19, **1957.** table. **DWB**—Account of Geophysical Discussion at Royal Astronomical Society, Nov 16, 1956. M. H. Hey, opening, described contribution of meteors and meteorites to earth's mass, their chemistry and structure, and the impact of a big meteorite with the earth. T. Gold also discussed mass contribution and craters on earth and moon, and possible instability patterns resulting from very large meteorites. J. G. Davies (of Jodrell Bank) and E. J. Öpik described magnitudes of meteors (sporadic and showers) based on radio observations. *Subject Headings:* **1. Meteor research 2. Radio meteor echoes 3. Symposia.**—*C.E/P.B.*

8H–93 523.5:621:396.9

Flood, Walter A. (*Cornell Aeronautical Lab., Inc., Buffalo, N. Y.*), **Meteor echoes at ultra-high frequencies.** *Journal of Geophyscial Research*, Wash., D. C., 62(1):79–91, March **1957.** 5 figs., 28 eqs. **DLC**—It is proposed that, at ultra-high frequencies, underdense meteor echoes have an effective scattering length L, which is much less than a Fresnel zone. Consequently, UHF meteoric echoes may be analyzed in terms of Fraunhofer diffraction theory, resulting in a relaxation of the requirement that a meteor trail be perpendicular to the radar line-of-sight before an echo can be received. Formulas for the back-scattered power, time duration, and echo rate are deduced. *Subject Heading:* **1. Meteor echoes.**—*Author's abstract.*

8H–94 523.51:061.3

Krinov, E. L., **Issledovaniia v oblasti meteoritiki.** [Researches in the field of meteoritics.] *Akademiia Nauk SSSR, Vestnik*, No. 2:114–117, **1957.** 2 figs. **DLC**—English trans. by E. R. Hope, issued by *Canada. Defence Research Board*, T 246 R, May **1957.** English trans. also available from Special Libraries Association, Translation Center, John Crerar Library, as its *R-1180.* 4 p.—Report on the 7th Meteorite Conference held in Moscow Nov. 14–17, 1956 under chairmanship of V. G. Fesenkov. Among the subjects discussed was the fall of meteoric dust from the Sikhote-Alin meteor explosion on Feb. 12, 1947. (A documentary film on the scientific expedition was shown) and the Krymka and the Omsk (Sept. 2–3, 1946) meteoric dust falls.) *Subject Headings:* **1. Meteorite Conference—Moscow 2. Meteoritic dust falls 3. Sikhote-Alin Meteorite explosion—1947. I. Hope, E. R.,** (*trans.*).—*M.R.*

8H–95 551.590.25

†*Lovell, A. C. B., **Geophysical aspects of meteors.** *Handbuch der Physik*, Berlin, 48:427–454, **1957.** 22 figs., 4 tables, 60 foot-refs., 10 eqs. **DWB**(551.03N236)—The evaporation of a meteor, methods and instruments for measuring the radiation and ionization, diurnal and seasonal variations in meteor influx, mass distribution, height range and frequency, scale height and density determinations, wind observations at very high levels by means of meteors (photographic and radio), recombination and diffusion of the ionized column, and effect of total meteor influx on ionospheric ionization are treated systematically and quantitatively, with many fine illustrations of both records and completed results. *Subject Headings:* **1. Meteors in the atmosphere 2. Meteor wind observation 3. Meteor drift measurement.**—*M.R.*

8H–96 523.51:539.16:546.711

Sheline, R. K. and Hooper, J. E., **Probable existence of radioactive manganese-53 in iron meteorites.** *Nature*, London, 179(4550):85–87, Jan 12, **1957.** fig., 15 refs. **DWB**—Amount of Mn-53

radioactivity in iron meteorites exposed to cosmic rays in solar space for a million years or more should be easily measurable. The expected activity is estimated and laboratory determination is planned. This should give an indication of constancy of cosmic ray intensity over about a million years. *Subject Heading:* **1. Meteorite radioactivity.**—*C.E.P.B.*

8H–97 551.590.25:621.396.9

Weiss, A. A. (*Div. of Radiophysics, C.S.I.R.O., Dep. of Physics, Univ. of Adelaide*) **The distribution of the orbits of sporadic meteors.** *Australian Journal of Physics*, Melbourne, 10(1):77–102 March **1957**. 14 figs., 5 refs., 11 eqs. **DLC**—The directions of the reflection points of sporadic meteor trails for March and Sept. 1953, and the hourly echo rates of sporadic meteors obtained from the Adelaide radio survey of meteor activity over 1952–1956 are analyzed. Diurnal and annual variations in the sporadic echo rate are predicted from contemporary theory on the reflection of radio waves from meteor trails for several model distributions. A sporadic distribution is derived which consists of a concentration of direct short-period orbits to the plane of the ecliptic superimposed upon a more uniform distribution of near-parabolic orbits. This distribution is consistent with the results of radar, visual, and telescopic surveys in the Northern Hemisphere. The density of sporadic meteors round the earth's orbit is also derived. *Subject Headings:* **1. Sporadic meteor trails 2. Radio meteor echoes 3. Meteor orbits.**—*Author's abstract.*

SUPPLEMENTARY MATERIAL

8H–98 551.590.25:551.574.1

Bigg, E. K. (*C.S.I.R.O., Sydney, Australia*), **Freezing nuclei in the atmosphere.** *Puy de Dome. Observatoire, Bulletin, Ser. 2*, No. 3:78–79, July/Sept. **1956**. 4 refs. Also: Soulage, G., **Reponse a la note de E. K. Bigg.** [Reply to preceding note.] *Ibid.*, p. 80–85, 14 refs. **DWB**—Discussion of SOULAGE'S (1956, *see* 8H–117) criticism of Cwilong's (1955, *see* 6I–132) attributing high nucleus counts were not observed at Clermont-Ferrand at that time. The author suggests that atmospheric stability could delay, or mixing could advance, the time when meteoric freezing nuclei reached the ground. Threshold temperatures, ability of meteoric dust to serve as active freezing nuclei (SCHAEFER, 1955) and desirability of making freezing nuclei measurements all over the world by a uniform and carefully controlled method suggested, are discussed. *Subject Headings:* **1. Meteoric dust hypothesis 2. Freezing nuclei count.**—*M.R.*

8H–99 551.590.25:551.577.32

Bilancini, Raul, **La polvere meteorica e la pioggia.** [Meteoric dust and rainfall.] *Rivista di Meteorologia Aeronautica*, Rome, 16(2):62–63, April/June **1956**. **DLC**—Bowen's theory (1953) (8H–25) claiming an effect of meteoric dust on rainfall has been criticized by several authors. This note is a review of papers containing statistical evidence which appears to refute Bowen's theory (SWINBANK and MARTIN, BHALOTRA, RAMAKRISHNAN). The author concludes that apparently cloud seeding does not produce very promising results even if done with star dust. *Subject Headings:* **1. Meteoric dust effects on rainfall 2. Bowen hypothesis.**—*G.T.*

8H–100 551.510.53:523.59

Fesenkov, V. G., **Zodiakal'nyi svet i vneshnaaia atmosfera zemli** [Zodiacal light and the outer earth's atmosphere.] *Astronomicheskii Zhurnal*, Moscow, 26(6):344–354, **1949**. 4 figs., table, eqs. **DLC**—Observations show that, in its lower part, the zodiacal light stretches abnormally far along the horizon when the ecliptic makes a very large angle with the horizon, namely in Sept. and Oct. before sunrise, and in Feb. and March after sunset. In this paper, the author shows that this abnormal extension cannot be connected with the zodiacal light itself, but must be caused by the earth's atmosphere. After having shown, theoretically and by observations carried out in Oct. 1948 in the South Balkash Desert with aid of a Fesenkov radioactive photometer, that this phenomenon of intensification of the sky's brightness near the northerly horizon does not depend on the possible intensification of the luminescence of the earth's atmosphere with the increase of the geographical latitude, the author comes to the conclusion that the outer layers of the atmosphere cannot have a form symmetrical with the earth and that there apparently is in the plane of the ecliptic a surplus of air mass which stretches out to a height of approximately 1000 km and, decreasing gradually, reaches zero near the pole of the ecliptic. *Subject Headings:* **1. Zodiacal light 2. Exosphere 3. Zodiacal twilight.**—*A.M.P.*

8H–101 523.51:546.29

Gerling, E. K. and Levskii, L. K., **O proiskhozhdenii inertnykh gazov v kamennykh meteoritakh.** [On the origin of inert gases in stony meteorites.] *Akademiia Nauk SSSR, Doklady*, 110(5):750–753, Oct. **1956**. 2 tables, 4 refs. **DLC**—The author presents new results on the content and isotonic state of inert gases found in stony meteorites. The results are presented in a table giving the meteor-

tes examined and the data obtained in previous studies as well as during the present study. An analysis of the content of He, Ar, Na—in the various meteorites indicates that the meteorites are derived from the disintegration of a cosmic body of planetary size. *Subject Headings:* **1. Meteoritic gases 2. Inert gases.**—*I.L.D.*

8H–102 551.501.89:551.590.25

Hawkins, Gerald S. (*Harvard College Obs., Cambridge, Mass.*) **Radar echoes from meteor trails under conditions of severe diffusion.** *Institute of Radio Engineers, N. Y., Proceedings*, 44(9):1192, Sept. **1956.** 2 figs., table, 7 foot-refs., 7 eqs. **DLC**—A simple expression is deduced for the power of the radio echo from a meteor trail when diffusion of the trail is predominant. It is shown that the echo is proportional to the 6th power of the wavelength and inversely proportional to the 4th power of the range. For a given meteor velocity there is a critical height above which the effects of diffusion become serious. The diffusion ceiling is given for the various wavelengths between 0.5 m and 16 m. *Subject Headings:* **1. Radar echoes from meteor trails 2. Meteor trails.**—*M.R.*

8H–103 551.590.25

Heybrock, Werner, **Die bemerkenswerte leuchtende Meteorwolke vom 17. November 1955.** [The remarkable luminous meteor cloud of Nov. 17, 1955.] *Meteorologische Rundschau*, 9(1/2): 25–26, Jan./Feb. **1956.** 2 figs. Also his: **Le grand météore du 17 Novembre 1955, observé a la Station Météorologique de Hornisgrinde (partie septentrionale de la Forêt-Noire).** [The large meteor of Nov. 17, 1955 observed from the Hornisgrinde Meteorological Station (northern part of the Black Forest).] *La Météorologie*, Paris, Ser. 4, No. 41:55–57, Jan./March **1956.** 5 figs. **DWB**—A meteor trail lasting from 1730–1751h was seen over the Black Forest possibly shining by its own light as well as by reflected sunlight. It split into streaks, the longest 2° long. It was visible over a very wide area. Its height was variously estimated as 80 km falling to 15 km, and 57 km. *Subject Headings:* **1. Meteor trails 2. Meteor, Black Forest (1955) 3. Black Forest, Germany.**—*C.E.P.B.*

8H–104 551.510.53 551.501.8:551.590.25

Kaiser, T. R. (*Jordell Bank Experimental Station, Univ. of Manchester*), **A new technique in upper atmosphere research.** (In: Boyd, R. L. F.; Seaton, M. J. and Massey, H. S. W., eds., **Rocket exploration of the upper atmosphere.** London, Pergamon, **1954.** p. 108–111. 2 figs., 12 refs., 2 eqs.) **DWB**—Values of atmospheric pressure, scale height, and wind velocity as a function of height (within a somewhat restricted range about 90 km) may be deduced from radio echo measurements of meteor heights and range drifts. *Subject Headings:* **1. Upper atmosphere research 2. Radio echo meteor soundings.**—*Author's abstract.*

8H–105 523.5

Obruchev, S. V., **Eschche o meste padeniia tungusskogo meteorita.** [Further remarks on the crater of the Tungus meteor.] *Priroda*, Moscow, 40(12):36–38, Dec. **1951.** **DWB**—A description of the microrelief and vegetation of the crater of the Tungus meteor, based upon aerial photographs. *Subject Headings:* **1. Meteorite craters.**—*I.L.D.*

8H–106 523.51:551.521.64

Öpik, E. J. and Singer, S. F., **Reinterpretation of the uranium-helium ages of iron meteorites.** *American Geophysical Union, Transactions*, 38(4):566–568, Aug. **1957.** 19 refs. **DWB, DLC**—Measurements of uranium and helium content of iron meteorites have been carried on by PANETH and his collaborates over the last 25 yrs, but the interpretation of their measurements has varied widely. The purpose of the present note is to suggest a reinterpretation in the light of (1) our recent knowledge of the cosmic-ray effects on meteorites, and (2) the physical mechanism of meteorite creation. *Subject Headings:* **1. Age of meteorites 2. Cosmic ray effects on meteorites.**—*Authors' abstract.*

8H–107 551.501.7:551.557

Whipple, Fred L. (*Harvard College Obs.*) **Evidence for winds in the outer atmosphere.** *National Academy of Sciences, Wash., D. C., Proceedings*, 40(10):966–972, Oct. **1954.** 2 figs., 27 refs. **DWB**—An integrated account of the numerous methods of estimating winds above the "balloon level." Some of these are: meteor trains (visual and radio tracking and Doppler techniques), noctilucent clouds, night glow, aurora, sound propagation, ionospheric motions, high altitude rockets, etc. Hope is expressed that the IGY will increase our knowledge or understanding of these motions on a global scale. *Subject Headings:* **1. Meteor trail wind observation 2. High level wind measurement.**—*M.R.*

8H–108 551.594.7:523.58

Billam, E. R. and Browne, I. C. (*both Univ. of Manchester, Jodrell Bank Experimental Station*), **Observations of polarization effects in radio echoes from meteor trails.** (In: Kaiser, T. R., *ed.*,

Meteors. London, Pergamon Press, **1955.** p. 73–77. 5 figs. (incl. photo), 5 refs., eqs.) **DWB**— An aerial system consisting of two Yagi arrays mounted on a common axis with their planes o polarization mutually perpendicular has been used to observe meteor echoes at 55 Mc/s. A pre liminary account is given of the results, which agree well with the theory of KAISER and CLOS for long-duration echoes. There is good qualitative agreement with the theory for short-duratio echoes, but the observed resonance is often greater than that predicted. Echoes in the transitio between short and long duration often behave anomalously. *Subject Headings:* **1. Radio echoes fro meteor trails 2. Polarization.**—*Authors' abstract.*

8H–109 551.574.1:551.590.2

Bull, G. A., **Meteoric dust as a source of freezing nuclei.** *Nature*, London, 179(4571):117(June 8, **1957. DWB**—Summary of investigations by BOWEN and others, generally supportin BOWEN's meteoric dust theory of rainfall. Maxima of freezing nuclei were found on some or al of Jan. 13, 22 and 29. Dates of cirrus cloud in W. Australia and first snow cover in Tokyo als support theory. *Subject Headings:* **1. Freezing nuclei 2. Meteoric dust effects on rainfall.**— *C.E.P.B.*

8H–110 523.

Hines, C. O. and Vogan, E. L., **Variations in the intrinsic strength of the 1956 quadrantid meteo shower.** *Canadian Journal of Physics*, Ottawa, 35(6):703–711, June **1957.** 6 figs., 12 refs. **DWB DLC**—The occurrence rate of meteoric signals, detected on a VHF forward-scatter path, is analyze for the time of the 1956 Quandrantid shower. The detection rate of the shower meteors is converte to an incidence rate, by use of the appropriate forward-scatter theory. The variation in the intrinsi strength of the shower is thereby determined, on an hour-to-hour basis, and it is compared wit variations which have been obtained in other years by other methods. The comparison reveals distinct secular shifting of the orbit of the Quadrantid meteor stream. It also illustrates the marke advantage of the new technique in assessing variations in the strengths of short-lived showers *Subject Headings:* **1. Radio meteor observation 2. Meteor showers.**—*Authors' abstract.*

8H–111 551.594.7:523.5

Kaiser, T. R. (*Univ. of Manchester, Jodrell Bank Experimental Station*), **The interpretation o radio echoes from meteor trails.** (In: Kaiser, T. R., *ed.*, **Meteors.** London, Pergamon Press **1955.** p. 55–64. 7 figs., 14 refs., 21 eqs.) **DWB**—The theory of the reflection of radio waves fron meteor trails is summarized. Particular attention is given to the case of a meteor moving in a atmosphere with a constant wind-shear. The effects of diffusion, attachment, and recombinatio are considered, and it is shown that the decay of ionization due to recombination is in general muc less rapid than the decay in the train luminosity produced by recombination. Some recent observa tions of visual magnitude vs. echo duration are given. A definition is proposed for a scale of "Radi Magnitude" related to the electron line density, so that a meteor of radio magnitude 5^m produce a maximum electron line density of 10^{12} cm^{-1}. *Subject Headings:* **1. Radio echoes from meteor trail 2. Radio wave reflection.**—*Author's abstract.*

8H–112 551.594.7:551.590.25:551.594.1

†Keitel, Glenn H., **Mode solutions for radio waves scattered by meteor trails.** Stanford Univ Radio Propagation Laboratory, Contract AF 19(604)-1031, Scientific Report, No. 1, April 30, **1955** 104 p. 28 figs., 3+tables, 29 refs., 93 eqs. **DWB.** Condensed version as **Certain mode solution of forward scattering by meteor trails.** *Institute of Radio Engineers, N. Y., Proceedings*, 43(10):1481 1487, Oct. **1955.** 11 figs., 14 foot-refs., eqs. **DLC**—A model assuming a Gaussian distribution o ionization (diffusion from a line) which would apply to any cylindrically symmetrical ionizatio column, is used in this study. The wave matching treatment is used to evolve theory for normal an oblique incidence. A high speed digital computer (SWAC) was used to obtain values of linear io density, column size, and collisional losses for incident wave using 3 different matching radii. Re flection coefficients for a low density column $q = 10^{13}$ electrons/m are compared by results obtaine by electron scatter analysis for a parallel polarized incident wave and a transverse polarized inciden wave. Echo duration, effect of collision losses, fields within column and details of integratio program are treated in separate sections. *Subject Headings:* **1. Radio wave scattering by meteo trails 2. Meteor ionization trails.**—*M.R.*

8H–113 551.594.12:551.590.2

Manning, Laurence A. (*Stanford Univ., Elec. Engin. Dept., Electronics Res. Lab., Calif.*) **The strength of meteoric echoes from dense columns.** *Journal of Atmospheric and Terrestria Physics*, London, 4(4/5):219–225, **1953.** 4 figs., 3 refs., 13 eqs. **DWB**—Calculation of the strengt of the echoes from dense meteoric ionization columns has been made in the past by assuming tha the trails behave like perfectly reflecting cylinders of that radius for which the refractive index i

zero. It is shown that this procedure neglects the defocusing effect of refraction at greater radii. A general formula is obtained for the effect of refraction on echo strength. The maximum power returned from a large dense Gaussian distribution of ionization is found to be only 70% of that assumed previously. *Subject Headings:* **1. Meteor ionization trails 2. Refractive index.**—*Author's abstract.*

8H–114 551.557:523.5

*Olivier, Charles P. (*Univ. of Penn.*), **Long enduring meteor trains and fireball orbits.** *American Philosophical Society Proceedings*, 101(3):296–315, June 20, **1957.** 2 figs., 5 tables, 6 refs. **DWB, DLC**—The excellent catalog of about 1500 long enduring (>10 sec.) meteor trains, published by the author in 1942 and 1947 (*see* 4F–25, June 1953, *MAB*), is brought up to date (1955) by the addition of data for 575 more meteors, and a tabulation of the monthly and annual frequency of 5000 fireballs, and a catalog of 102 fireballs (1913–1955) and their properties. Mean heights, direction of winds in America, Europe and overall seasonal variations, colors, ratios of drift observations to total meteor observations, verification by photographic and radio methods, etc., are discussed and shown in tables and graphs. The enduring meteor train is a comparatively rare phenomenon, at least for eye observations such as these, constituting only about 1/750 of the total. Night, twilight and daytime observations are differentiated. Trails are observed much more often in the last half of the year than in the first. Winds were observed most often from the S. and W. in America; from the E. and less often from the N.W. in Europe. Neither directions, speeds or heights are altered much by the supplementary data used in this paper, as can be seen by comparative wind roses. *Subject Headings:* **1. Meteor trails data 2. Ionospheric winds from meteor trails 3. Fireball data.**—*M.R.*

8H–115 523.51

Pokrzywnicki, Jerzy, **O meteorycie Rôżana I zjawiskach towarzyszacych jego przelotowi W atmosferze.** [On the Rôżana meteorite and the phenomena which accompanied its passage through the atmosphere.] *Acta Geophysica Polonica*, Warsaw, 3(2):62–77, **1955.** fig., 26 refs. French and Russian summaries p. 74–77. **DWB, DLC**—Extracts from Polish newspaper information published in Dec. 1894 and Jan. 1895 giving details of the flight of the Rôżana meteorite on Dec. 7, 1894, are reviewed and discussed. They facilitate the determination of the probable point of the first appearance of the bolide which, after having travelled about 230 km, fell at 7:30 p.m. near the small city of Rôżana, 38 km S.E. of the city of Slonim. It was accompanied by intense acoustic and luminous phenomena. The author concludes that this bolide resembles in many respects the Pultosk bolide. Both were stony meteorites and probably electrophonic. The author further discusses the angle under which the bolide reached our atmosphere, the length of the trajectory, and the mean speed of its flight, which was 17.7 km/sec. *Subject Headings:* **1. Rôżana meteorite (1894) 2. Bolides 3. Rôżana, Poland.**—*A.M.P.*

8H–116 551.594.7:551.590.25:551.594.12

†Villard, O. G., Jr.; Eshleman, R. v.; Manning, L. A. and Peterson, A. M. (*all, Radio Propagation Lab., Stanford Univ., Stanford, Calif.*), **Role of meteors in extended-range VHF propagation.** *Institute of Radio Engineers, N. Y., Proceedings*, 43(10):1473–1480, Oct. **1955.** 8 figs., table, 15 footrefs., 2 eqs. **DLC**—The main factors influencing the propagation of continuous radio signals by reflection from meteoric ionization trains are reviewed and summarized. A procedure is given for calculating the system parameters required to maintain the signal received over a given path above the cosmic background noise level for 95% of the time. It is pointed out that the variation of signal level with frequency and path length measured for certain "ionospheric forward scatter" circuits agrees well with calculations based on the assumption that the propagation is entirely by scattering from meteor ion trains. It is suggested that ionospheric scatter is predominantly meteoric at night in the lower latitudes. To the extent that this is true, the minimum performance level of existing circuits could be improved by use of antennas designed to maximize the meteoric component of the signal. Present designs actually tend to discriminate against meteors. *Subject Headings:* **1. Radio wave propagation 2. Meteor ionization trails 3. Meteor influences.**—*Authors' abstract*

8H–117 551.590.25:551.574.1

Soulage, G. (*Observatoire du Puy de Dôme*), **A propos des noyaux de congélations météoritiques de l'atmosphere.** [Concerning atmospheric freezing nuclei of meteoric origin.] *Puy de Dome. Observatoire, Bulletin, Ser.* 2, No. 1:15–17, Jan./March, **1956.** 12 refs. **DWB**—Although not rejecting the hypothesis of Bowen's regarding nucleation by means of meteoric dust, the author cautions against jumping at conclusions merely because of a coincidence between maxima or minima of dust and of rainfall. Meteoric dust does not appear to be a good nucleating agent, whereas other kinds of dust and pollen, etc., usually present in the air do provide good nucleation under proper conditions. *Subject Headings:* **1. Meteoric dust hypothesis 2. Nucleation 3. Bowen hypothesis.** —*M.R.*

PART III. REVIEWS, TRANSLATIONS, REPRINTS, ROUTINE PUBLICATIONS, AND ANALYTICS FROM RECENT SERIALS AND COLLECTED WORKS

Note: Material listed in these sections will not be included in the monthly indexes until abstracted. The item number is mentioned for those titles which have been abstracted in previous issues of **Meteorological Abstracts and Bibliography.**

A. REVIEWS OF IMPORTANT METEOROLOGICAL MATERIAL

Abetti, Giorgio: **The sun.** N. Y., Macmillan, 1957. Trans. by J. B. Sidgwick of the 1954 rev. ed. 336 p. figs., plates. Price, $12.00. Review by Seth Nicholson in *Science*, Wash., D. C., **125**(3252):828–829, April 26, 1957.

Kendrew, Wilfred George and Kerr, D.: **The climate of British Columbia and the Yukon territory.** Ottawa, Edmond Cloutier, 1955. 222 p. 54 figs., 8 photos, 101 tables. Review in *Weather*, London, **12**(7):232, July 1957. (*See* 8.5-23, May 1957, *MAB*)

Moore, Patrick: **The planet Venus.** London, Faber and Faber, 1956. 132 p. 13 figs., 8 plates, tables. Price, 15 sh. Review by R. M. Goody in *Royal Meteorological Society, Quarterly Journal*, **82**(354):551, Oct. 1956.

Petterssen, Sverre: **Weather analysis and forecasting.** 2d ed. N. Y., McGraw-Hill, 1956. 2 vol. figs., tables, eqs., bibliogs. Review by F. H. Ludlam in *Science Progress*, London, **45**(177):141–142, Jan. 1957. *For abstract on Vol. 1, see* 7.8-4, Aug. 1956, *MAB*. *For abstract on Vol. 2, see* 8.4-7, April 1957, *MAB*)

Physical Society of London: **Physics of the ionosphere: report of the Physical Society Conference held at the Cavendish Laboratory, Cambridge, Sept. 1954.** London, 1955. 406 p. numerous figs. Review in *Geofisica e Meteorologia*, Genoa, **4**(1/2):85, Jan.–April 1956. (*See* 7.2-2, Feb. 1956, *MAB*)

Schmid, Josef: **Der Bodenfrost als morphologischer Faktor** [Ground frost as a morphological factor]. Heidelberg, Alfred Hüthig Verlag, 1955. 144 p. 27 figs., 5 plates. Review in *Scottish Geographical Magazine*, **73**(1):57–58, April 1957.

Schnelle, Fritz: **Pflanzen-Phänologie** [Plant phenology]. Leipzig, Akademische Verlagsgesellschaft Geest and Portig, 1955. 299 p. 46 figs., maps, tables, refs. (*Probleme der Bioklimatologie*, Vol. 3) Price, DM 28.50. Review by F. Seyfert in *Angewandte Meteorologie*, Berlin, **2**(7):222–223, April 1956. (*See* 8.1-7, Jan. 1957, *MAB*)

Searle, Sidney, ed.: **Plant climate and irrigation.** Chichester Press, 1954. 154 p. 32 figs. Price, 20 sh. Review in *Weather*, London, **12**(7):230, July 1957. (*See* 6.7-4, July 1955, *MAB*)

Sperner, Emanuel: **Eine mathematische Analyse der Luftdruckverteilung in grossen Gebieten** [Mathematical analysis of atmospheric pressure distribution in large areas]. *Arbeitsgemeinschaft für Forschung des Landes Nordrhein-Westfalen*, No. 27, 1956. Review by A. Hoiman, in *Meteorologische Rundschau*, Berlin, **9**(7/8):152, Aug. 1956.

Stenz, Sigwart: **Über den Einfluss von Witterung und meteorologischen Grössen auf die Ertragsleistung von Obstgehölzen** [On the influence of weather and meteorological values on orchard yield]. *Leipzig, Karl-Marx-Universität, Institut für Agrarmeteorologie, Veröffentlichungen*, **1**(2):77–114, 1955. 7 figs., 5 tables, 46 refs. Review by R. Seyfert in *Angewandte Meteorologie*, **2**(11):352, Feb. 11, 1957. (*See* 8.3-84, March 1957, *MAB*)

Stormer, Carl: **The polar aurora.** Oxford, Clarendon Press, 1955. 404 p. 34 plates. Price, 55 sh. (*International Monographs on Radio*) Review R. H. Collingbourne in *Meteorological Magazine*, London, **85**(1011):282–283, Sept. 1956. Review by V. C. A. Ferraro in *Nature*, London, **178**(4536):713, Oct. 6, 1956. (*See* 7.4-16, April 1956, *MAB*)

Täumer, Friedrich: **Eine Methode zur Bestimmung der Gebietsverdunstung auf meteorologischer Grundlage** [Method of estimating areal evaporation on a meteorological basis]. *Leipzig, Karl-Marx-Universität, Institut für Agrarmeteorologie, Veröffentlichungen*, **1**(1), 1955. 71 p. 12 figs., 19 tables, 63 refs., 18 eqs. Review in *Meteorologische Rundschau*, Berlin, **9**(7/8):152.

Aug. 1956. Review by R. Knepple in *Angewandte Meteorologie*, 2(11):351–352, Feb. 11, 1957. Review by B. Antonik in *Zeitschrift für Meteorologie*, 10(9):287, Sept. 1956. (*See* 8.5-135, May 1957, *MAB*)

Thomson, Sir George Paget: **The foreseeable future.** Cambridge, Univ. Press, 1956. 166 p. Review in *Science and Culture*, Calcutta, 22(8):470, Feb. 1957. Review by John F. Hart in *Geographical Review*, N. Y., 46(4):582–583, Oct. 1956. Review by R. C. Sutcliffe in *Weather*, London, 11(9):299–300, Sept. 1956. Review by P. Morrison in *Physics Today*, N. Y., 9(7):26–28, July 1956. (*See* 7.6-6, June 1956, *MAB*)

Van Allen, James A. (ed.): **Scientific uses of earth satellites.** Ann Arbor, Univ. of Michigan Press, 1956. 316 p. figs., tables, bibliogs. Price, $10.00. Review by Homer E. Newell, Jr. in *Science*, Wash., D. C., 125(3261):1301–1303, June 28, 1957. (*See* 8.4-6, April 1957, *MAB*)

B. TRANSLATIONS, REPRINTS, AND ROUTINE PUBLICATIONS

TRANSLATIONS

Bagariatskiĭ, B. A.; Krasovskiĭ, V. I. and Mordukhovich, M. I.: **K voprosu ob infrakrasnom izluchenii nochnogo neba i poliarnykh siianiĭ** [On the problem of infrared emission of the night sky and the aurora]. (In *Akademiia Nauk SSSR, Doklady*, n.s., 82(4):579–580, 1952. table, 2 refs. Trans. into English available from American Meteorological Society as its X-5 DDC. 3 p. (*For abstract on original, see* 3.10-154, Oct. 1952, *MAB*)

Flohn, Hermann: **Studien zur allgemeinen Zirkulation der Atmosphäre** [Studies on the general circulation of the atmosphere]. *Germany, Deutscher Wetterdienst in der US-Zone, Berichte*, No. 18, 1950. 52 p. 28 figs., 8 tables, refs. Trans. into English available from Special Libraries Association, Translation Center (John Crerar Library, Chicago) as its Translation 3100. 60 p. (*See* 2.5-72, Feb. 1951, *MAB*)

Israël, Hans: **Luftelektrische Erfahrungen in den Polargebieten** [Atmospheric electric observations in the polar regions]. (In) *Polarforschung*, Kiel, Ser. 3, 23(1/2):210–215, 1953. 4 figs., 10 refs. Trans. into English issued by Special Libraries Association, Translation Center (John Crerar Library, Chicago), as its No. 57-1441. 13 p. (*See* 7.7-263, July 1956, *MAB*)

Krasovskiĭ, V. I.: **Izluchenie neba i poliarnykh siianiĭ: iz programmy Mezhdunarodnogo geofizicheskogo goda** [Airglow and auroral radiation: from the program of the International Geophysical Year]. (In) *Akademiia Nauk SSSR, Vestnik*, 26(5):29–31, May 1956. Trans. into English by E. R. Hope, issued as *Canada, Defence Research Board*, T 224 R, Aug. 1956. 4 p. Mimeo. Another Trans. into English by Special Libraries Association, Translation Center (John Crerar Library, Chicago), as its No. 294, Feb. 1957, with title **Study of sky and aurora.** (*See* 8B-153, Feb. 1957, *MAB*)

Materialy nabliudenii nauchno-issledovatel'skoĭ dreĭfuiushcheĭ stantsii 1950 51 goda [Observational data of the scientific drifting station of 1950 1951]. ed. by Michail M. Somov. Leningrad, Morskoĭ Transport, 1955. 3 vols. Trans. into English by American Meteorological Society under Contract AF 19(604)-1936. 3 vol. in 9 sections. Sections available separately (see its T-47, 90, 102, 127, 193, 194, 199, 208, 226, 290, etc. RUX). Available for reference DNHO.

Wyrtki, Klaus: **Die Bilanz des Längstransportes in der Brandungszone** [Balance of the alongshore transport in the surf zone]. *Deutsche Hydrographische Zeitschrift*, 6(2), 1953. Trans. into English issued by Special Libraries Association, Translation Center (John Crerar Library, Chicago) as its 57-2019. 23 p.

REPRINTS

Arakawa, Hidetoshi: **Climatic change as revealed from freezing dates of Lake Suwa (36°N, 138°E) in Central Japan.** (In) *International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings*. pub. London, 1956. p. 145–146. table. (*For abstracts on this paper from other sources, see* 6.5-283 and 6.8-310, May and Aug. 1955, *MAB*)

Charnock, H.: **Turbulence in the atmosphere and in the ocean.** *National Institute of Oceanography, Wormley, Collected Reprints*, 4(138), 1956. (8 p.) 3 refs. (*See* 7.6-154, June 1956, *MAB*)

Drummond, A. J.: **Notes on the measurement of natural illumination, Pt. 1, Some characteristics of illumination recorders.** 10 figs., 5 tables, 27 refs. *Eppley Laboratory, Inc., Newport, Rhode Island, Reprint Series*, No. 2, 1956. (*See* 8.2-80, Feb. 1957, *MAB*)

Petterssen, Sverre; Estoque, Mariano A. and Hughes, Lawrence A.: **Experiment in prognostication.** In: Chicago, Univ. Dept. of Meteorology, Contract AF 19(604)-1293, **Final Report**, Feb. 1957. Sec. G (32 p.) 13 figs., 5 tables, 7 refs. (*See* 8.4-134, April 1957, *MAB*)

ROUTINE PUBLICATIONS

Denmark. Meteorologisk Institut: **Nautisk-Meteorologisk Årbog, 1941, II del: Meteorologiske Observationer** [Nautical Meteorological Yearbook, 1941, Pt. 2, Meteorological Observations]. pub. Copenhagen, 1956. 26 p. "10th and last issue of the series of meteorological observations to fill the 1932–1941 gap. Previous to 1932, such observations were included in the **Meteorologisk Årbok**; from 1942—in the **Nautisk-Meteorologisk Årbog.**" (*See* 7.3-94, March 1956, *MAB, for abstract on 1939 and 1940 issues*)

Netherlands. Meteorologisch Instituut: **Upper Air Data, Vol. 37, 1952.** pub. 1955. unpaged. entirely tables. (*See* 3.11-48, Nov. 1952, *MAB, for 1950 and 1951 issues*)

Portugal. Serviço Meteorológico Nacional: **Anuário Climatológico de Portugal, Pt. 2, Territórios Ultramarinos (Observações de Superficie)** [Climatological Annual of Portugal, Pt. 2, Overseas Territories, Surface Observations]. **Vol. 9, 1955.** pub. 1956. 118 p. almost entirely tables.

Uppsala. Universitet. Meteorologiska Institutionen: **Bulletin Mensuel de l'Observatoire Météorologique** [Monthly Bulletin of the Meteorological Observatory], **Vol. 87, 1955.** pub. Uppsala, 1957. 76 p. almost entirely tables.

C. METEOROLOGICAL ARTICLES APPEARING IN RECENTLY ISSUED PUBLICATIONS

Akademiia Nauk SSSR. Geofizicheskiĭ Institut, Trudy, No. 33(160), 1956

Monin, A. S.: **Poluempiricheskaia teoriia turbulentnoĭ diffuzii** [Semiempirical theory of turbulent diffusion], p. 3–47

Krechmer, S. I.: **K voprosu ob izmenchivosti napravleniia vetra,** [On the question of variability of wind direction], p. 48–59

Chaplygina, A. S.: **24-chasovye izmeneniia termobaricheskikh poleĭ v svobodnoĭ atmosfere,** [24-hour variations of the thermobaric fields in the free atmosphere], p. 60–105

Akademiia Nauk SSSR, Izvestiia, Ser. Geograf., No. 2, 1957

Kort, V. G.: **Osnovnye resul'taty pervogo reĭsa morskoĭ antarkticheskoĭ ekspeditsii Akademii Nauk SSSR,** [Chief results of the first Antarctic Sea Expedition of the Academy of Sciences of the USSR], p. 3–13

Armand, D. L.: **Zakonomernosti pogloshcheniia livnevogo stoka v lesnykh polosakh,** [Laws of absorption of storm rain runoff in forest belts], p. 13–32

Dubinskiĭ, G. P.: **K voprosu ob izuchenii teplovogo i vodnogo rezhima zemnoĭ poverkhnosti,** [Question of the study of thermal and water regime of the earth's surface], p. 94–96

Rutkovskaia, V. A.: **K voprosu ob uluchshenii vodnogo rezhima rek gornogo Kryma,** [Problem of the improvement of water regime of the Crimean mountain rivers], p. 106–112

Dobrovol'skiĭ, A. D.: **Iu. M. Shokal'skiĭ kak okeanograf,** (I. M. Shokal'skiĭ, oceanographer), p. 120–123

Komkov, A. M.: **Iu. M. Shokal'skiĭ kak kartograf,** (I. M. Shokal'skiĭ, cartographer), p. 123–127

Simonov, I. M. and Egor'eva, A. V.: **Nauchnaia sessiia pamiati Iuliia Mikhaĭlovicha Shokal'skogo v Geograficheskom obshchestve SSSR,** [Scientific session of the Geographical Society of the USSR, dedicated to Iu. M. Shokal'skiĭ], p. 127–134

Rogov, A. B.: **Pamiati Iu. M. Shokal'skogo,** [In memory of Iu. M. Shokal'skiĭ], 134–136

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Avsiuk, G. A.: **Podgotovka k Mezhdunarodnomu geofizicheskomu godu 1957-1958,** [Preparation for the International Geophysical Year, 1957/1958], p. 158–162

Ermakov, A. V. and Ioganson, V. E.: **IV Vsesoiuznaia konferentsiia po izucheniiu selevykh potokov,** [IVth All-Union Conference on the study of flash floods], p. 162–164

American Geophysical Union, Transactions, Vol. 38, No. 3, June 1957

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Donn, William L.: **A case study bearing on the origin and propagation of 2- to 6-second microseisms,** p. 354–359
American Geophysical Union. Committee on Runoff: **Report of the Committee, 1955-1956,** p. 379–384
Abstracts of the papers presented at the 38th Annual Meeting, Wash., D. C., April 29-May 2, 1957, p. 385–421
IGY Bulletin, No. 1 (for titles in this section, *see below under* IGY Bulletin)

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American Meteorological Society. District of Columbia Branch, Proceedings of the Workshop on Stratospheric Analysis and Forecasting, Wash., D. C., Feb. 1-3, 1956. Pub. Wash., D. C. 1956

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Kalle, Kurt: **Fluoreszenzmessungen in Niederschlagswässern und in künstlichem Rauhreif,** [Measurements of fluorescence of precipitation and of artificial hoar-frost], p. 374–385

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